Evolutionary dynamics of spliceosomal intron revealed by *in silico* analyses of the P-Type ATPase superfamily genes

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Abstract

It has been long debated whether spliceosomal introns originated in the common ancestor of eukaryotes and prokaryotes. In this study, we tested the possibility that extant introns were inherited from the common ancestor of eukaryotes and prokaryotes using *in silico* simulation. We first identified 21 intron positions that are shared among different families of the P-Type ATPase superfamily, some of which are known to have diverged before the separation of prokaryotes and eukaryotes. Theoretical estimates of the expected number of intron positions shared by different genes suggest that the introns at those 21 positions were inserted independently. There seems to be no intron that arose from before the diversification of the P-Type ATPase superfamily. Namely, the present introns were inserted after the separation of eukaryotes and prokaryotes.

Keywords

Spliceosomal intron · Introns -late theory · Introns -early theory · Simulation · Proto -splice site · P -Type ATPase

Introduction

Eukaryotic genes often contain non-coding regions called introns that interrupt the protein-coding regions of these genes. Introns are transcribed along with the coding regions into nuclear pre-mRNA and spliced out by the spliceosome, a eukaryota-specific component, during mRNA maturation. These introns are called spliceosomal introns.

Spliceosomal introns are often found at the same positions in homologous genes and even in ancient genes that diverged before the separation of prokaryotes and eukaryotes [1,2]. Therefore, some researchers believe that these introns existed in the common ancestor to prokaryotes and eukaryotes before the divergence. On the other hand, it is known that insertion and deletion of spliceosomal introns occurs frequently [3,4], and, therefore, it is possible that these introns were inserted independently at identical positions in ancient homologous genes after the separation of prokaryotes and eukaryotes [5]. The origin of these introns has long been controversial and is referred to as the “introns-late” versus “introns-early” debate [6].

Several researchers have independently attempted, by statistical approaches, to identify the origin of introns in genes that diverged before and after the separation of prokaryotes and eukaryotes, but their conclusions are inconsistent [1,5,7,8]. These contradictory results may be due to the researchers’ distinct assumptions of the positions that allow intron insertion in genes. Iwabe et al. and Kersanach et al. assumed all the nucleotide-nucleotide junctions allow intron insertion [1,8], and their results supported “introns-early” theory. In contrast, “introns-late” theory was supported by Sverdlov et al. , who estimated only “proto-splice sites” are available for intron insertion [7]. Thus, the researchers who set relatively many positions for intron insertion in genes reached “introns-early” theory, and the researchers who set a few positions proposed “introns-late” theory.

In this study, we focused on the P-Type ATPase superfamily, one of the largest gene superfamilies found in both prokaryotes and eukaryotes. This superfamily consists of 5 families. Family 1 comprise the K^+ and heavy metal ion transporters, Family 2 the Ca^{2+} ion transporters, Family 3 the H^+ transporters, Family 4 the lipid translocators, and Family 5 comprise unknown substrates. All the families are found in eukaryotes, and Families 1-3 are also found in prokaryotes [9,10]. Therefore, Families 1-3 are believed to have diverged before the separation of prokaryotes and eukaryotes. Furthermore, although the amino acid sequences share only ~20% identity, the protein structures of all P-Type ATPases are basically similar. Nevertheless, eukaryotic P-Type ATPase genes contain many spliceosomal introns, and some of which exist at the same positions in homologous genes diverged before the separation of prokaryotes and eukaryotes. Now, we can obtain over 100 genes in P-Type ATPase from the gene database. Taking advantage of this large superfamily, we addressed the question about “introns-early” vs “introns-late” theory by our newly established method which enables to eliminate the

unknown variables such as number of positions in the estimation of introns insertion.

Materials and Methods

P-type ATPase superfamily

Gene sequences of the P-Type ATPase superfamily were obtained by database search in GeneBank [11]. The search was conducted in the genomes of 7 animals, 2 plants, 4 fungi, and 5 protists in Dec. 2007. It covered all the eukaryotic organisms whose complete or draft genomes were available at that time. All the P-Type ATPase genes of those organisms referred as RefSeq [12] were collected, except the genes which had stop codons in its coding regions or lacked extremely large regions because these were probably the pseudo genes.

Intron Mapping

The gene sequences were aligned based on their translated amino acid sequences by MAFFT [13], and the alignment was manually modified. Sequences were reverse-translated into nucleotide sequences, and introns were mapped on the alignment.

Note that we applied two different rules, strict and generous rules, for selecting intron positions. Under the strict rule, intron positions in well-aligned regions without any gaps were selected (see Supplemental Data 1). Under the generous rule, all the positions, except the gap-rich regions where intron positions were hardly comparable, were selected.

Genetic Distance

Genetic distance is the phylogenetic distance within a pair of genes calculated by the PROTDIST program in the PHYLIP package [14]. Jones-Taylor-Thornton matrix was used as the scoring matrix.

Index to evaluate the degree of intron inheritance

If introns are independently inserted into two distinct genes, the probability for their insertion at identical positions is calculated as

$$prob_{AB(i)} = (C_i \times (C_{I_{AB_all} - I_a} C_{(I_b - i)})) / C_{I_b} \quad \text{Eq (1)}$$

where $prob_{AB(i)}$ is the probability that intron position i is common to genes A and B, I_a and I_b are the numbers of introns in

genes A and B, respectively, and I_{AB_all} is the number of the nucleotide-nucleotide junctions allowing intron insertion in genes A and B. In this formula, all nucleotide-nucleotide junctions are assumed to allow the intron insertion with the same probability.

The expected value for the number of intron positions shared by genes A and B (E_{AB}) is calculated with the following formula.

$$E_{AB} = \sum_{i=1}^{I_{AB_all}} (i \times p_{AB}) \quad \text{Eq (2)}$$

Here, we introduce an index, *Ratio* (R), to evaluate the degree of intron inheritance from their ancestor in a pair of genes. R for gene pair A and B is calculated as

$$R_{AB} = O_{AB} / E_{AB} \quad \text{Eq (3)}$$

where O_{AB} is the actual number of intron positions shared by gene pair A and B.

Tree-based weight

Due to the inclusion of highly homologous sequences such as isoforms and paralogs in the sequence population, it is erroneous to treat all of the sequences equally [15]. In this study, we introduced tree-based weight (Fig. 1).

Weight was assigned based on branch length of phylogenetic trees of each family, using kdpB, P-Type ATPase of *Escherichia coli* (NP_415225) as an outgroup. The trees are made by the NEIGHBOR program in the PHYLIP package [14]. Negative branch lengths were set to zero. This method is the same as the method used in CLUSTAL W [16] with the single modification of excluding a normalization step in order to reduce round-off errors.

The tree-based weight of the gene pair A and B is given by

$$W_{AB} = (V_A \times V_B)^{1/2} \quad \text{Eq (4)}$$

where V_A and V_B are the tree-based weights of genes A and B, respectively.

Simulation test of the R values

One 3522 bp (average length of P-type ATPase genes analyzed in this study) gene with 16 introns (average number of introns present in the P-type ATPase genes) was artificially constructed as an ancestral gene for *in silico* simulation. The genes were repeatedly duplicated *in silico* with the mutation rate per nucleotide at 0.001, and the R values were calculated under different conditions considering the rate of gain and loss of introns and the position preference of intron insertion. The mutation rate was arbitrarily selected because this rate itself never affected the convergence of the R values (data not shown). The detailed procedures are as following.

i) Effect of the rates of gain and loss of introns

After the duplication of the gene, introns were removed on the rates of intron loss (High = 0.6, Middle = 0.4, Low = 0.3 per intron), and new introns were inserted on the rates of intron gain (High = 0.006, Middle = 0.004, Low = 0.003 per nucleotide-nucleotide junction). Position preference was not considered (all the nucleotide-nucleotide junctions allow the intron insertion with the same probability). These steps were repeated 8 times and 256 genes with different number of introns were obtained. Then, R values were calculated in each case.

ii) Effect of position preferences for intron insertion

After the duplication of the gene, introns were removed on the rates of intron loss (0.4 per intron). Then, new introns were inserted into duplicated genes on the rates of intron gain (0.004 per nucleotide-nucleotide junction). In this step, the positions of intron insertion were restricted to 25%, 50% and 100% of the nucleotide-nucleotide junctions. These steps were repeated 8 times and 256 genes with different number of introns were obtained. Then, R values were calculated in each case.

Results and Discussions

We collected sequences of 354 eukaryotic genes encoding P-Type ATPases by database search, and identified the positions of all introns in those 354 genes (Table 1). We also investigated introns in prokaryotic P-Type ATPase gene and found no introns. Under the strict rule (using well-aligned region among P-Type ATPases. See Intron Mapping section in Materials and Methods), there were 949 introns mapped into 111 positions and under the generous rule (using whole regions except for gap-rich regions in the alignment), there were 4,120 introns mapped into 631 positions (Supplemental Table 1). The 949 introns under the strict rule are a subset of the 4,120 introns under the generous rule. Among the 111 and 631 intron positions identified, 21 and 67 positions were shared by at least two different families, respectively (Fig. 2, Table 2). The numbers 21 and 67 are larger than those reported in similar analyses [1,5,17].

In the case that introns are independently inserted into two different genes, the expected value for “the number of intron positions shared by two genes” can be estimated by Eq (2). If the number of actual intron positions shared by two genes is larger than this expected value, it is reasonable to judge that one or more of the introns have been inherited from a common ancestor (in this paper, we call such introns as “inherited introns”). Therefore, we introduced an index, *Ratio* (*R*) (Eq (3)), to evaluate whether the introns are likely to have been inherited from a common ancestor or to have been inserted independently. Homologous genes that have diverged recently, such as isoforms, are expected to have high *R* values because almost all the introns will be conserved. In contrast, the *R* values for homologous genes that diverged early in the evolution likely to be small, because many insertion/deletion events are thought to have occurred since their divergence. Most of the introns in distant homologues likely to have been inserted after divergence, and, therefore, the O_{AB} values are expected to be close to the E_{AB} values.

The *R* values of all gene pairs ($354 \times 353 / 2 = 62,481$ pairs) were calculated except for 30,096 pairs under the strict rule and 6,688 pairs under the generous rule. To analyze the ancestry of inherited introns, the *R* values were plotted against the genetic distance of each pair, where genetic distance was used to represent the relative time since divergence (Fig. 3a, 3b). The majority of *R* values were almost zero, while some pairs had relatively high *R* values. Since *O* is the actual value in Eq (3) and there will be variation in the *O* value, resulting in scattering in the distribution of *R* values. For example, if genes A and B independently gain 6 and 4 introns, respectively, the possible number of the intron positions shared by the two genes varies from 0 to 4. In this case, there is a high probability of an *R* value of 0 and a very low probability that the *R* value will be extremely high (Table 3). Thus, the relatively high *R* values in Fig. 3a and 3b may not due to the existence of inherited introns, but caused by the existence of introns independently inserted to the identical positions which will occur

with small probability.

Therefore, we averaged the R values at every genetic distance to assess the overall trends in R dynamics (Fig. 3c, 3d, 3e, 3f). To avoid over-estimation of R values associated with the presence of many closely related homologues like isoforms, we applied tree-based weights in the average calculation. The R values of intra-family pairs showed a drastic decline with longer genetic distances. This result suggests that recently diverged pairs inherit most of the introns from a common ancestor and that the inherited introns were removed soon after the divergence. In the case of inter-family pairs, the R value stays low and constant. This trend did not change when pair selection was restricted to the genes that had diverged before the separation of prokaryotes and eukaryotes (Fig. 3e, 3f). Since the R value becomes small when one or both members of pair lose inherited introns, these results indicate that the deletion of inherited introns have occurred quickly under the assumption that new intron insertions/deletions occur continuously, and consequently the R values become constant.

According to the definition of R , the R value should stay as 1 if all the introns are inserted independently. Nevertheless, for most genetic distances, the R values of inter-family pairs were greater than 1 (Fig. 3c, 3d, 3e, 3f). There are two possible explanations for such a result. One possibility is, of course, that inherited introns preferentially remain in the genes. In this case, particular pairs of inherited introns should remain regardless of the genetic distance. However, there is no such intron in the P-type ATPases identified (Supplemental Table 1), and, therefore, it is unlikely that introns inherited from an ancestral gene of each family are conserved.

There are several important factors for *in silico* intron analysis such as the rate of gain and loss of introns and the position preference of intron insertions [17, 18]. Here, we simulated how the rate of gain and loss affects to the R values with the set of hypothetical genes and introns (Figure 4a). While the rate affects the declining speed of the R values, it never affects the convergence values ($R = 1$). Therefore, our observation that the R values of P-Type ATPase stayed as over 1 were not be caused by the different rates of gain and loss of the introns.

In contrast, the position preference affected the convergence values of R (Fig. 4b). The simulation showed that the R values became larger than 1 if the positions of intron insertion were restricted. This is well consistent with our result that R value of P-type ATPase stayed at over 1. Therefore, it is likely that there are particular positions that allow intron insertion more frequently than others in P-Type ATPase genes (insertion hot spots).

It has been reported that introns often found at the particular nucleotide sequence: A[A/C]AG! [A/G]T [19-21] or !CTC [20] (! is the positions where introns are found). These sequences are believed to act as the “proto-splice site” and allow for easy intron insertion. In the case of the P-Type ATPase, the nucleotide preference at -4 to +4 positions before/after the introns are A[A/C]AG!GTT (Table 4), and are compatible to the reported sequences in other genes [19-21]. In addition, introns are often found in the phase 1 codon of conserved glycines [22]. The P-Type ATPase superfamily has 50 amino acids

conserved in over 80 % members (Table 5), and 11 out of 13 conserved glycine contain introns at Phase 1. Since the glycine codon is GGN, it is reasonable that Phase 1 of glycine naturally constitutes proto-splice sites and potential intron insertion hot spots. Such a relationship between amino acid conservation and intron insertion is also observed with other amino acids, including lysine, which occupies 3 out of the 50 conserved positions in the P-Type ATPase superfamily. The lysine codons are AA[A/G], and phase 3 of all 3 lysine codons have been the target of intron insertion (Table 5). Thus, such conserved amino acids may provide the positions for intron insertion hot spots. Other factors, such as “domains / modules” of proteins [2,23,24] and “phase” in the codons [25] have been reported to affect to the presence of introns. Those factors may also provide the positions for intron insertions hot spots and be responsible for high *R* values.

Concluding Remarks

In conclusion, the introns found at the same positions among the inter-families pairs were not inherited from a common ancestor but were inserted independently after the divergence. Thus, the introns found in the genes belonging to the P-Type ATPase superfamily were independently acquired since the separation of prokaryotes and eukaryotes, supporting the “introns-late” theory. As shown in this study, particular sites on genes accumulate more introns than others. This bias may result in independently inserted introns appearing to be conserved since the separation of prokaryotes and eukaryotes.

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Fig. 1. Scheme of tree-based weights

g1, g2 and g3 represent genes, and b1, b2, b3 and b4 represent provisional branch names. Values in parentheses indicate the branch lengths. The tree-based weight is the summation of the weight of each branch, which is calculated as (length of the branch)/(number of genes which belong to the branch).

For the representative tree shown here, the tree-based weight of g3 is estimated as (length of b2)/2 + (length of b4) = 1.5/2 + 0.5 = 1.25; likewise, that of g1 is 2.0.

Fig. 2. An example of the intron positions in the alignment of P-Type ATPase.

The first three letters of the gene name represent the species name (osa; *Oryza sativa*, rno; *Rattus norvegicus*, ani; *Aspergillus nidulans*, hsa; *Homo sapiens*, ath; *Arabidopsis thaliana*, dre; *Danio rerio*, gga; *Gallus gallus*, cne; *Cryptococcus neoformans*). Roman numbers of the gene name indicate the family of P-type ATPase to which the genes belong to. (I; Family 1, II; Family 2, III; Family 3, VI; Family 4, V; Family 5). The genes shown here are osa_I (NP_001058417.1), rno_I (NP_036643.1), ani_II (EAA64748.1), hsa_II (NP_001001396.1), ath_III (NP_180028.1), osa_III (NP_001067382.1), ani_IV (EAA58087.1), dre_IV (XP_693773.2), gga_V (NP_001026485.1), and cne_V (XP_570514.1). The BLOSUM 62 score table was used for the shading with GeneDoc package (<http://www.nrbsc.org/gfx/genedoc/>). The arrows indicate intron positions identified by the strict rule. Colors of the arrows represent the phases of introns; white for phase 0, grey for phase 1 and black for phase 2. Asterisks on the arrows indicate that the introns were conserved across different families.

Fig. 3. Correlation between genetic distance and the index, *R*.

a,b; *R* of intra-family pairs (circles) and inter-family pairs (triangles) are plotted against their genetic distances. a represents the plots under the strict rule (intra-family pairs; n=8,895, inter-family pairs; n=23,490). b represents the plots under the generous rule (intra-family pairs; n=16,440, inter-family pairs; n=39,353). c,d; Weighted means of *R* of the intra-family pairs (circles) and the inter-family pairs (triangles), respectively, calculated at genetic distance intervals of 0.2. Error bars indicate $\pm$ SE which represents the relative scattering of *R*. Magnifications of the line charts are shown in insets to clarify the trend of the *R* of inter-family pairs. Weighted means of *R* under the strict rule and under the generous rule are shown in c and d, respectively. e, f; *R* of the inter-family pairs were classified into two groups: pairs of genes which had diverged before the separation of prokaryotes and eukaryotes (pairs which members belong to Family 1-2, 2-3 or 1-3, point-down triangles) and the other inter-family pairs (diamonds). e represents *R* under the strict rule (pairs diverged before the separation; n=4,572, other inter-family pairs; n=18,918). f represents *R* under the generous rule (pairs diverged before the separation; n=7,378, other inter-family pairs; n=31,975).

Fig. 4. The effects of “rates of gain and loss of introns” and “position specific preference of intron insertion” on the *R* values.

a; Effects of rates of gain and loss of introns on *R* values. The *R* values of hypothetical genes and introns were simulated under the high (circle and times superimposed), middle (circle and plus superimposed) and low (square and plus superimposed) rates of loss and gain of introns. b; Effects of position specific preference of intron insertions on *R* values. Introns were supposed to be inserted into all the nucleotide-nucleotide junctions (circle and plus superimposed), into 50% of nucleotide-nucleotide junctions (square and times superimposed) and into only 25% of nucleotide-nucleotide junctions (diamonds and plus superimposed).

Supplemental Data 1. Alignment of amino acids used in this study.

Amino acids given in upper-case letters were used under the strict rule, while under the generous rule, amino acids given in upper- and lower-case letters, except for “x”, were used. The letter “x” represents amino acids which were not used in any calculations.

Supplemental Table 1. Positions of introns found in the P-Type ATPase genes and the names of genes which have introns at these positions.

The first column indicates positions of nucleotides before the introns, and the second column indicates positions of nucleotides after the introns. The third and subsequent columns indicate the names of genes.

Table 1. Numbers of genes belonging to the P-Type ATPase families in different organisms.

Kingdom	Species	Family1	2	3	4	5
Animals	Homo sapiens	3	15	-	13	5
	Mus musculus	2	13	-	12	5
	Rattus norvegicus	1	13	-	11	5
	Gallus gallus	2	8	-	10	4
	Danio rerio	2	18	-	12	1
	Drosophila melanogaster	1	4	-	6	2
	Caenorhabditis elegans	1	9	-	5	4
Plants	Arabidopsis thaliana	7	13	11	12	1
	Oryza sativa	6	10	9	2	1
Fungi	Schizosaccharomyces pombe	-	-	-	3	1
	Magnaporthe grisea	2	9	1	4	1
	Cryptococcus neoformans	1	4	2	4	2
	Aspergillus nidulans	2	10	2	4	1
Amoebozoa	Entamoeba histolytica	-	-	-	4	-
	Dictyostelium discoideum	3	5	1	9	4
Chromalveolata	Plasmodium falciparum	1	1	-	2	2
	Theileria parva	-	1	-	2	2
	Theileria annulata	-	1	-	2	2

Table 2. Profiles of intron positions among the P-type ATPase gene families

	Intron positions found in one gene	Intron positions shared in different genes belong to the same family	Intron positions shared in different genes belong to the different families	All intron positions
generous rules	236	328	67	631
strict rules	29	61	21	111

Table 3. Probability distribution of the number of shared intron positions in a gene pair.

Number of intron positions shared in two genes ^a	Probability	R
0	0.96598	0.00000
1	0.03365	29.08333
2	3.66E-04	58.16667
3	1.41E-06	87.25000
4	1.53E-09	116.33333

a: An example of one gene with 6 introns and another with 4 introns under the strict rule: the heavy metal transporting ATPase gene of *Arabidopsis thaliana* (NP_001031920.1) and calcium-transporting ATPase gene of *Danio rerio* (NP_001007030.1). $I_{AB_all}=689$, $E_{AB}=0.03438$.

Table 4. Nucleotide species around the exon-intron borders.

Nucleotide	Distance								
	-4	-3	-2	-1	!	+1	+2	+3	+4
A	31.2%	35.0%	59.8%	10.3%		24.1%	21.3%	26.6%	27.2%
T	25.6%	13.9%	18.1%	9.1%		10.9%	42.6%	30.0%	25.9%
G	20.9%	16.6%	11.4%	77.6%		54.0%	17.6%	22.6%	25.2%
C	22.4%	34.5%	10.7%	2.9%		10.9%	18.5%	20.9%	21.8%

Table 5. Existence of introns in the 50 amino acids conserved in over 80% P-Type ATPase members.

Amino acid	Position in the alignment	Introns are found at			
		Phase 0	Phase 1	Phase 2	Phase 3
A	3944	- ^a	-	-	-
A	4439	-	-	-	○
A	4751	-	-	-	-
A	5752	!	-	-	-
A	5898	○	-	-	-
D	2172	-	-	-	-
D	2232	-	□	-	○
D	3167	-	-	-	-
D	4719	○	-	-	-
D	4746	-	-	-	-
D	5741	-	-	-	-
D	5745	-	-	-	-
E	2391	-	-	-	-
E	3156	-	-	-	-
F	4101	-	-	-	-
G	2171	-	-	-	-
G	2390	-	!	○	-
G	2799	-	!	-	-
G	3159	-	○	-	-
G	3170	-	!	-	-
G	4438	!	□	-	-
G	4713	-	○	-	-
G	4745	-	!	-	-
G	5091	-	-	-	-
G	5740	-	○	-	-
G	5742	-	○	-	-
G	5755	-	!	-	-
G	5922	-	○	-	-
K	3168	-	-	-	!
K	4342	-	-	-	!
K	5660	-	-	-	!
L	2388	-	-	-	-
L	3005	-	-	-	-
L	3192	-	-	-	-
M	1	-	-	-	-
N	1530	-	-	-	□
N	5744	-	-	-	-
P	2230	-	-	-	○
P	3002	-	-	-	-
P	5657	-	-	-	-
P	6044	-	□	-	-
R	4652	-	-	-	-
R	5654	-	-	!	-
T	3169	!	-	-	-
T	3191	-	-	-	-
T	3193	-	-	□	-
T	4744	-	-	-	-
T	4750	-	-	-	-
V	2795	!	-	-	-
V	5664	-	-	-	-

a: Positions in which no genes have introns are shown by “-”. Introns present in more than two distinct families (!), introns present in the more than two distinct genes in the same family (○), and introns present in only one gene (□) are also listed.

#Supplemental Data 1

#Molecular Biology Reports

#Evolutionary dynamics of spliceosomal intron revealed by in silico analyses of the P-Type ATPase superfamily genes

#Toshiyuki Oda, Ryosuke L. Ohniwa, Masatsugu Denawa, Hideyuki Okamura and Kunio Takeyasu

>athI_IB101 NP_195444.1

[illegible]

mghna-----nihvImalaa--fasvf
l lamxn-----lahiaeeffts-----rs
mvdvkelkes-----

-----npdxall-----xxxxxxxxx
pnixx-----xx-xxx-----v
p-----
vhsVEVGSYVLVgt-----
GEIVPVDCEVYqg-----

-----xatITIEHLTGEEKPLEAkx-----

-----x-----

-----DRVPG-GARN-----
ld---grmi-----vKATKAWNDSTLNkivqltee-----

-----ahsnkpk|qrw|defgenyskvvvvlslaia
-flgpflfkwpflsta-----acrgsvyraLGLMVA
SPCALAVA-PLAYATAIS-SCarkg-----

-----iLLK-GAQVLDALASCHTIAFDKTG-----
-----TLTTGGLTck-----aiepiyg-----

-----xxxxx-xx-x
xxxxxxxxx-----

-----xx
xxalava-----aame-----

kgthpigravvdh
x-xxxdlp-xx
fvesfeyfpgrglta-tvng-xx
xxxxxx-xxxxxx
-l-
gsi
e-fitslfksed
e-skqikdaxxassx-gkdfVHAALsvx
xkVTLIHLEDQPRPGVSGVIAELKSwaxLRV
MMLTGDHDSSAWRVANAVGI-te
VYC-NLKPEDKLNHVKNla
-rexg-GLIMVGEgINDAPALAAATVGIVLxx
xxxxx
AIAVADILLR-DNITGVpfcVAKSRQTTSLVKQNV-A

lal-----tsixxxxxxxxxx-----xxxxx
xxxxxxxxxllvcInsv-----rgIndps-----

-----wswkqdivhlinxlrxxxxxxxxxxxxxxxx-----

h
>athI_IB102 NP_179501.1
m-----

a l q n x x x x x x x x
l q k s y f d v l g i c t s e v p i i
e n i l k s l d g v k e y s v i v p s r t v i v h d s l l i s p
f q i a k a l n e a r
l e a n v r v n g e t s f k n k w p s x
x w l a v a a v a a g i
y p i l a k a f a s i k r p r i d i n
i l v i x x x i a t l a m q d f m e a a a
v v f l x t i s d w l e t r a s y k a t s v
m q s l m s l a p q
k a i x a e t
x x x
e
v d e V K V D T V V A V k a
G E T I P I D G I V V d g
x c e V D E K T L T G E A F P V P K q x
x
S T V W A G T I N
l n g y i c v K T T S L A G D C V V A k m a k l v e e
a q s s k t k s q r l i d k e s q y y t p a i i l v s a c v a
i v p v i m k v h n l k h w f h l a L V V L V S G
C P C G L I L S t P V A T F C A L T - K A a t s g

-----ILIK-SADYLDTLSEIKIVAFDKTG-----
-----TITRGEFIVi-----dfkslsrdi-----

-----xx
xxllywv-----ssve-----

-----sksshpm-----atidy-----akxxx-----
-----xxxrpe-----

-----evedyqnfpggyg-kidgxxxxx-----

-----gnk
k-----iasragcst-----

-----vpeievd---tkg---gktvGYVYVGe-----
-----xLAGFFNLSDACRSGVSQAMAELKSIg-IKT
AMLTGDNQAAAMHAQEQLGN-----vix-----

-----xVHG--DLLPEDKSR I IQEFk-----
--ke--g-----PTAMVGDGVNDAPALATAD I G I SM--
-----xisgsal-----

-----ATQTGNI I LMs-ND IRRIPqaVKLARRARRKVVENV-----C
Isixlkaxi-lalxxxxxxxxxxxx-----xxx
xxxxxxxxxfnsmllirex-----k k i g n k k x x x a--x t s k l n g r k
lxxxxxxxxxxxxxxxxxxxxx-----

gqxxxxccgdkknqenvvmxpsxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xx
xxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xx
xx
xx
xxxxxxxxxxxxxxxxxxxxx-----

a
>athl_IB103 NP_194740.1

m-----

-----a-----xxx-----
-----mtksyfdvlgicctsevpli-----
-----eni lnsmdgvkefsvivpsrtvivvhdtilsq-----
-----fqivkaInqaq-----
-----leanrvrtgetnfknkwpsxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xwIavaavvagi-----
-----ypilakavaslarfridin
ilvv-----xxxgat---igmqdyteaav
vvflx-----tiaewlqsras-----yk-----as---av
mqslmslapq-----
-----kavxaet-----
-----xxx-----v
e-----
-----vdeLKTNTVIAVka-----
-----GETIPIDGVVVdg-----

-----xceVDEKTLTGAEFPVKIx-----

-----x-----

-----STVWA--GTIN-----

In---gyit-----vNTTALAEDCVVAKmaklvee-----

-----aqnsktetqrfdkcskyytpaiilisicfv

-aipfalkvh-----nlkhwwhlaLVVLVSA

CPCGLILStPVATFCALT-KAatsg-----

-----ILIK-GADYLETLAKIKIVAFDKTG-----

-----TITRGEFIVm-----dfqslsedi-----

-----xx

xxllywv---sste-----

-----sksshpmma--aavvdy---arxxx-----

-----xxxkpe-----

-----avedyqnfpggeiyg-kidgxxxxx-----

-----gnk

r-----iasragls-----

-----vpdi dvd--tkg-----gkktiGYVYVGex-----
-----|AGVFNLSDACRSGVAQAMKELKS|g-|K|
AMLTGDNHAAAMHAQEQLGN-----amx-----

-----XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

e
>osal_IB101 NP_001058417.1
m-----

-----qlltaasaxassaxxx
xxxxxxxxxxxxpxlrrrcaphlpskplnlaarsplllarrslpxxxxxxxx-----
-----hghhhhhghghshhhgpev-----

-----hgsgggaavmrvakai gwadvadalxxxxxxxislgl
l iaacphipx-----

-----lnsvrrlqdal-----

-----iavaflvgvsaal-----
-----dalvniadgki-----

-----nihvImalaa--fasif
mgns-----leggl
llamxn-----lahiaeehfts-----ks
midvrelken-----

-----hpexall-----xxxxxxx-----
--aqfxx-----xx--xxx-----v
p-----
----vhdLEVGSFILVra-----
----GEAVPVDGEVYqg-----

-----xstVTIEHLTGETKPLERTx-----

-----x-----

-----DAIPG--GARN-----
le--gmmi-----vKVTKSWEDSTLnrivqltee-----

-----gqlnkpk|qrw|defgehysrvvvv|slvva
-llgpllfkwpffgns-----vcrgsiyrgLGLMVAA
SPCALAVA-PLAYATAIS-SLaskg-----

-----iLLK-GGHVLDALSACQSI AFDKTG-----
-----TLTTGKLMck-----aieping-----

-----xxxxx--xxxx
xxxxxxxx-----
-----xx
xxalava--aame-----

kgthpigravldh
x-xxxdlp-xx
avesfec|pgrgvva-t|sg-xx
xxxxxx-xxxxxx
-i-gsv
e-yisslyrss
e-seqikeaxxasax-gpefVQAALTx-xx
VTLFHFEDEPRSGVCEVISTLRDkaxLRIMMLTGDHESSALRVAKAVCI-de
VHC-CLKPEDKLNKVKAVs
-rexsg-GLIMVGDGINDAPALAAATVGIVLxx
xxxxx
AVAVADVLLLq-DNICGVpfC|AKARQTTSLVKQSV-A

lal-----scixxxxxxxxx-----xxxxx
xxxxxxxxx|lvc|nsi-----ra|nspt-----

-----wswvddirqlinx|xxxxxxxxxxxxx-----

-----xxxxxxx-----

|
>osal_IB102 NP_001059240.1

m-----

ss
 lmgmlpvkav
 iatxgev
 v
 s
 vrdVRVGDVVAVra
 GEIVPVDGVVVdg
 xseVDERSLTGESFPVPKq
 x
 fdgyia
 SEVWA GTMN
 vRTTALAENSTVAKmer lvea
 aqnsrsktqr l idscakyytpavvvvaagva
 lipallgad
 gleqwwk l aLVMLVSA
 CPCALVLStPVASFCAML-RAarmg

-----iFIK-GGDVLESLGEIRAVAFDKTG-----
-----TITRGEFSId-----sfhlvgdhk-----

-----xxx
xxllywi-----asie-----

-----sksshpm-----aalvey-----aqxxx-----
-----xxxnpe-----

-----nvgdfriypgegiyg-eihgxxxxx-----

-----gnr
r-----tlarasspqs-----

-----tqemgem-----ik-----gvsiGYVICDg-----
-----xIAGVFSLSDDCRTGAAEAIRELGSIg-IKS
VMLTGDSSAAATHAQQQLGG-----vmx-----


```

-----xLHS--ELLPEDKVRVLVSLk-----
--ar--fg-----PTMMVGDGMNDAAALAAADVGVSM-----
-----xi sg saa-----

```

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXX-----
```

၁၀၀

m-

[illegible]

XX
XX
XX
xxx-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
xxxxxx--xxxxx-----XXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX
-----xxxreaiedmgxdaal-----
-----xxxxxp-lvviaqpsletpllpssnel-envmtsvqn-----
-----kcyiqvsgmtcascvani-----

-----ernlrreegiysvlvalmagkaevrynpaviqpr-----viaefi
relgfgamvmx-----

-----xxxxxxxxxxxxxxxxxscascvhkiestl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----XXXXXXXX
xxx-----aslkkdrsanhldhkrei-----
-kqwrsgsflvs|xxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkh-ktxnmdvliatlattiafayslv
i|lv-----xxxxx-----akv--npitffdtppm
lfvf-i-----algrwlehiak-----gk-----ts--ea
laklislqat-----

-----eatxvtl-----
xxxnllxx-----xxx-----v
d-----
----ve|VQRGDI|KVvp-----
----GGKFPVDGRVleg-----

xsmVDESLITGEAMPVAKkx
 x
 STVIA—GSIN
 qn—gsll—iRATHVGADTTLSqivklvee
 aqtskapiqqfadklsgyfvpfivlvsivtl
 -lvwiiigfqnfivexxxxxxxxxxxxxxxxirfafqasITVLCIA
 CPCSLGLAtPTAVMVGTG—VGaqng
 iLIK—GGEPLEMAHKVKVVVFDKTG
 TITHGTPVn—qkvivesn
 xxxxx—x
 -ilaiv—gtae
 snsehlpg—aavtky—ckxx
 xx—tet—xx
 tctdfqvvpqcgisc—kvtnxxxxxxxxxx
 x—xxxxxxxxxxxxxxxxxxxx
 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx—x
 -i
 gnr
 e—wmirnglvis

-----xxv-desmieh--err-----grtaVLVTIDdx-----
-----|CGLIAIADTVKPEAELAVHILKSmg-LEV
VLMTGDNSKTARSIASQVG|-----tk-----

-----VFA--EVLPSHKVAKVKQLq-----
--ee--gk-----RVAMVGDGINDSPALAMANVGIAI--
-----gtgtdv-----

-----AIEAADVVLlr-NDLLDVasIDLSRKTVKRIRINF-----V
fal-yn-l-vgi-----x-----
-----iaagvf|pi-x-----|v|qpwm--g--saamaass
v-----

sv---v|ss|f|k|yrkpt-yd-xxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxx
xxxxxxxxx-xxxxxxx-----xx-xxxx-----
-----xxxxxxx-----x-xxxxxxxxxxxx-----
-----xxxxxxx-----

-----xxx-----

|-----xxx

>mmul_IB202 NP_031537.1

m-----xxxxxxxxxxxx
xxxxxxxxxx-----xxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
xxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
xx-----
-----xxxxxxxx
xx
xxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxx
xx-xxxxxxxxxxxxxxxxxxxxxxxx
xx-----xxxxxxxx-----
xx
-----xxrtavedmgxevsvxxxx
xxxxxxxxxxxxxxxxvxtmgdiagsvqkmapdtrglpthqpgghssxxxxxxxx-----
-----sqkcfvqikgmtcascvsn-----

-----erslqrhagilsvlvalmsgkaevkydpei iqsp-----riaqli
qdlgfeasvmx-----

-----xxxxxxxxxxxxxxxxtcascvhnieskl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxx
xxx-----aslaqrnpnahhl dhktei-----
-kqwksf lcs lxxxxxx-xxxxxxxxxxxx-----xxxxxxxxxxxx

xxrh-rsxnmdvli vlattiayayslv
i | vv-----xxxxx-----aek---spvtffdtppm
lfvf-i-----algrwlehvak-----sk-----ts---ea
laklmslqat-----

-----eatxvtl-----
xxxnl ix-----xxx-----v
p-----
---me | VQRGDV | KVvp-----
---GGKFPVDGKVLeg-----

-----xtmADESL | TGEAMPVTKkx-

-----x-----

-----SIVIA--GSIN-----
ah---gsvl-----| KATHVGNDTTLAqivklvee-----

-----aqmskapiqqladrfsgyfvpfiiiistltl
-vvwivigfvdfgvvqxxxxxxxx-----xxxxxiirfafqts | TVLCIA
CPCSLGLAtPTAVMVGtG-VAaqng-----

-----vL | K-GGKPLEMAHK | KTVMFdKTG-----
-----T | THGVPRVm-----rf | l | adva-----

-----xxxxx--x-----

-----v | avv-----gtae-----

assehpI g vavtky ckxx
 xx tet xx
 ystdfqavpgcgisc-kvsxxxxxxxxxx
 xxxxxxxxxxxxxxxxxxxxxxxxx-x
 -i
 gnr
 e wmrngltis
 xxi-sdamtdh-emk-gqtaILVAIDgx
 ICGMIAIADAVKPEAALAIYTLKSmg-VDV
 ALITGDNRK TARAIATQVGI-nk
 VFA-EVLPSHKVAKVQELq
 ne-gk-KVAMVGDGVNDSPALAQADVGIAI
 gtgtdv
 AIEAADVVL Ir-NDLLDVVasIHL SKRTVRRIRVNL-V

l a l - i y n - m - v g i ----- x -----
----- i a a g v f m p i ----- x ----- i v l q p w m ----- g ----- s a a m a a s s
v -----

-----xxxxxl-pvgitqptskeql--esaepetskmlrsfvaxxxx--x--
-----l skcyiqvtgmtcascvani--

-----ernlrredgihsvlvalmagkaevrynpavihps-----aiaeli
relgfgatvmx-----

-----xxxxxxxxxxxxxxxxxtsaacvhkiestl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--

-----xxxxxxxx
xxx-----talvkkdrsashldhrqei-----
-rqwrrsffvs|xxxxxx--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkh-rtxnmdvli vlatsvafvysfv
illv-----xxxxx-----akv--npvtffdtppm
llaf-i-----slgrwlehvak-----gk-----ts--ea
larlislqat-----

-----eatxvtl-----
xxxnillx-----xxx-----v
d-----
---ve|VQRGD|VKVvp-----
---GGKFPVDGRV|eg-----

-----xsmVDESLITGEAMPVTKkx--

-----x-----

-----NTVIA--GSIN-----
qn---glll-----iSATHVGADTTLSqivklvee-----

-----aqtskapiqqfadkisgyfvpfi vvvsvvtl
-fawii igfvdfeivexxxxxxxxx--xxxxxiirfafqasITVLCIA
CPCSLGLAtPTAVMVGtG-VGa qng-----

[illegible]

```

-----VFA--EVLP SHKVAKVQLq-----
--de-gk-----RVAMVGDGINDSPALAMANVGIAI--
-----gtgtdv-----

```

-----AIEADVVLlk-DDLMDVVasIDLSRKTVKRIRINF-----V
fal-iy-n-l-vgv-----x-----
-----iaagvf lpi-x-----lv lqpwm-g-saamaass
v-----

```
sv-----v|ss|||kmyqkps-se-xxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxx
xxxxxxxx-xxxxxxx-----xx-xxxx-----
-----xxxxxxx-----x-xxxxxxxxxxx-----
-----xxxxxxx-----
```

-----XXX-----

-----XXXX

1

>ggal_IB202 XP_417073.2

```
mXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX-----XXX-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
```


XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----XXXXXXXXXX
XX
XXX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX--XXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--XXXXXXXXXXXXXXXXXXXX
XX
-----xxrraaieemgxdas|xxxx
xxxxxxxxxxxxxxxxxqvsvntsvg|mpvmpqhs|epq---sl|axxxxxxxxxx---
-----akkcf|qitgmtcascvsti---
-----ernlqkedgi|svlvalmagkaeikykpefiqpl-----eiaqli
qnlgfeatvix-----
-----xxxxxxxxxxxxxxxxxtcascvhnieskl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----XXXXXXXXXX
xxx-----asvsrrvpnthnl dhkkei-----
-qqwrksf|cs|xxxxxx-xxxxxxxxxxxx-xxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkx-kaxnmdvlivlattiayvyscv
illv----xxxxx-----aek---spvtffdtppm
lfvf-i-----algrwlehiak-----sk-----ts---ea
laklislat-----
-----eatxvtl-----
xxxhsixx-----xxx-----v
p-----veIVQRGDIVKVvp-----
GGKFPVDGKVIeg-----

xsmADESLITGEAMPVTKkx
 x
 STVIA—GSIN
 ah—gsvl—vNATHVGNDTTLAqivklvee
 aqmskapiqqladkfsgyfvpfiiistvtl
 -iawitigfinfdiiqxxxxxxxxxx—xxxxxxilrfafqtsITVLSIA
 CPCSLGLAtPTAVMVGtG—VAaqng
 iLIK—GGKPLEMAHKIKTVMFDKTG
 TITCGVPKVm—rvlllgdta
 xxxxx—x
 vlavv—gtae
 assehlpg—vavtky—ckxx
 xx—tqs—xx
 yctnfqavpgcgisc—kvggxxxxxxxxxx
 xxxxxxxxxxxxxxxxxxxxxxxxx—x
 -i
 gnr
 e—wmrrnglhia

[illegible]

xxly-rfxsmnflisagttvayvssla
i lim-----xxxxxx-----hsd---ahsstyfdtvv
fltlxi-----lagrymeaysk-----gr-----ag---da
vaalgklr-----

-----pse-ali-----x-----
---vnaxx-----xx---xxx-----i
d-----
---vdILEIGDIVQVph-----
---GASPPADGRlAgI-----

-----xxfqFDESSLTGESKPVSKtx-

-----x-----

-----DQVYT---GSVN-----
vg---qpve-----iQITAlGRSSMLDqiiavvre-----

-----ggkraplqrvadtlvghfvpa itliavltf
-viwvslgvsgalpsdxxxxxxxx-----wpfwslefaIAVFVVA
CPCGLALAaPTALFVGGG-LAaryg-----

-----iLVKxGGEAFQEASRLNAIVFDKTG-----
-----TLTEGGSLOv-----xxhesl itdss-----

-----xx
xxawava---rkle-----

xxxxxx | veul gxxg | v

-----|---etstsragprgsestdpssqsmtttva-----
-----iegmtcgactssv---

-----qaafdgvvgviqfnisllaeraaiithn-pqilps-----xkiveii
edagfdakvvxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxrdansaaaleds|-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx
xxxxxxx-----dsddkntqlles-laktkev-----
-lewrraflfslxxxxxxxxxxxxxxxxxxxxx-----xxxxxx
xxrh-raxtmdvlvmlgtsaaffysvf
tmiv-----xxxxx-----phq---rpntvfdtstm
litf-i-----tlgrwlenrak-----gq-----ts---aa
lsrlms--la-----

-----psm-ttixxxxxxxxxxxxxx-xxxxxxx-----xxxxxxx-----
x--qki-----i
p-----
----telIEVGDIVVLhp-----
----GDKVPADGVVlr-----

-----x-x---tyVDESMITGEALPIHKax-

-----x-----SLVIA--GTVN-----
gt---savd-----iKVIRTGKDTQLSkivklvqd-----

-----aqtstrasirqmadivagylvpsiiislgltvf
-fgwmfvshl|phppkxxxxxxxxx-----kvmvc|klc|SVIVFA
CPCALGLStPTAVMVGtG-VGatqg-----

iLVK-GGAVLEAATKI THVVDKTG
TLTTGQMSVt ear i ephws
xxxxxxx
xxwwliv glae
mnehpig kaihla
xxxxxxx xxxggl xx
slgdfear igkgiaa lvepxxxxxxxxxx
x x
-i gna
a flqshsvavpx
xxxt-tpdasgyxxsrv gitqlHVAID
xxfAGTIALQDTVKVTAVA AVALHRmg IST
SLITGDSRAAAISIASAVGI apx

```

-----xVHA--SVSPSDKQSI IASLq-----
--et-gd-----RVAMVGDGINDSPALATASVGIAL--
-----asgtdv-----

```

```
sv-----vvsslllkfwrprpsxmd-xxxxxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxx-xxxxxxxx-----xxxxxxxx
-----xxxxxxxx--xx-xxxxxxxx-----
```

V

m-

[illegible]

xtyVDESMVTGEAMPVQKk
 x
 STVIG GTVN
 gh grvd fRVTRAGRDTQLSqivklvqd
 aqttrapiqrladtlagifvptiilglftf
 atwmv lshv lanppkxxxxxxxxx kvfvc lklc lSVIVFA
 CPCALGLAtPTAVMVGtG lGaeng
 iLVK GGAALETATTITKVVLDKTG
 TITYGKMRVa nahiaehwq
 xxxxxx
 xxwwtiv glae
 mgsehpvg kav lga
 xxxxxxxx xxxgti xx
 svgdfeaavgrgisavvepxxxxxxxxxx
 x x
 v gni
 k flrqnnvnvpxxxxx

xxxxxxxxxxk-rkagssdxssa---gttnIFIAIDgx-----
-----yAGHLCLSDT I KEGAAAA I AVLHRmg-IKT
AIVTGDQRSTALAVAASVGI-----spx-----

-----xVYA--GVSPDQKQAIVKQMq-----
--eq--ge-----CVAMVGDGINDSPALATADVGIAM--
-----ssgt dv-----

-----AMEAADVVLMrxDDL MNIPaaLHLARSIFTRIKMNL-----A
wac-myn-v-vgl-----x-----
-----fanglflpy-x-----lhlpma--a--gaamalss
v-----

sv---vvssllklwkrpsxmd-xxxxxxxxxxxxx-----
-----xx-----xxxxxxx-----
-----xxxxxxx---xx-xxxxxxxxxxxx-----
-----xx-----

-saavsi|at|-----

xxxxxxxxxxxxxxxxxxxxvhxgsxemdmlvvisitaayvysl
 afgf-----xxxgrp-----leteeffetst
 llitxv-----llgrlvaafar-----mr-----a
 vaavslrslq

 -----astxllv-----
 gqkxx-----xx---xxx-----m
 d
 arILQYGDRFKVlp
 HSTVPTDGIVTsg

 -----xseVDESMLTGEAVPVPKex-----

 -----x-----NTVVA-----GTVN-----
 gs-----gtlv-----vQLTRLPGKNTVTdiaklvee-----

 -----aanskpkiqdvadrvagwfpvvtvtailat
 -iwwiivgikvrsfpaxx-----avadavtyaVAVLAIS
 CPCALGLAvPMVLVVAGG-Iaargg

 -----vVIK-SAESTERARKVTDVVFDKTG-----
 -----TITESELDit-----xdeyplnhlv-----

 -----xx
 xxaaiia-----rava-----

wsa-----xx

```
xxxxxxxxxga|-----vavr|ppxxx-----
```

-----glgeivsvlpvii axat-----

-----XXXXXXXXXXXX-----

>hsal_IB201 NP_000043.2

m-----

-----X

[illegible][illegible][illegible]

XX

XXX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXX--XXXXX-----XXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXX

[illegible][illegible]

```
-----xxrgaiedmgxdatl-----
```

-----xxxxxp-lvviaqpssemplltstnefytkgmpvqdxxxxx---x---
-----sskcyiqvtgmtcascvani---

-----ernlrreegiysi lvalmagkaevrynpaviqpp-----miaefi
relgfgatvix-----

-----xxxxxxxxxxxxxxxxxscascvhkiessl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx
xxx-----asl vkkdrsashldhkrei-----
-rqwrrsf lvs lxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkh-ktxnmdvli vlattiafaysli
illv-----xxxxx-----akv---npitffdtppm
lfvf-i-----algrwlehiak-----gk-----ts---ea
laklislqat-----

-----eatxvtl-----
xxxnillx-----xxx-----v
d-----
---ve lVQRGD l lKVvp-----
---GGKFPVDGRV leg-----

-----xsmVDESL l TGEAMPVAKkx-

-----x-----

-----STVIA---GSIN-----
qn---gsll-----iCATHVGADTTLSqivklvee-----

-----aqtskapiqqfadklsgyfvpfivfvsiatl
-lvwivigflnfeivexxxxxxxxx-xxxxxxiirfafqas lTVLCIA
CPCSLGLAtPTAVMVGtG-VGa qng-----

-----VFA--EVLP SHK VAKVKQLq-----
 --ee-gk-----RVAMVGDGINDSPALAMANVGIAI--
 -----gtgtdv-----

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----XXXXXXXXXX
XX
XXX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----xxxraai edmgxeasvxxxx
xxxxxxxxxxxxxxxxmxqtt dgtptsv qevaphtgr lpanhapdi laxxxxxxxxxx-----
-----pqkcf lqikgmtcascvsni-----
-----ernlqkeagvlsvlv almagkaeikydp eviqpl-----eiaqfi
qd lgfeavmx-----
-----xxxxxxxxxxxxxxxxxtcascvhnieskl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----XXXXXXXXXX
xxx-----aslqrnpnahhl dhkme i-----
-kqwksf lcs lxxxxxx-xxxxxxxxxxxxx-----xxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxrh-rsxnm dvlivlatsia yvyslv
ilvv-----xxxxx-----aer-----spvtffdtppm
lfvf-i-----algrwlehlak-----sk-----ts-----ea
laklmslqat-----
-----eatxvtl-----
xxxnlix-----xxx-----v
p-----
---meIVQRGDIVKVvp-----
---GGKFPVDGKVLeg-----

-----x t m A D E S L I T G E A M P V T K k x-----

-----x-----

-----S T V I A-----G S I N-----
a h-----g s v l-----i K A T H V G N D T T L A q i v k l v e e-----

-----a q m s k a p i q q l a d r f s g y f v p f i i m s t l t l
-v v w i v i g f i d f g v v q x x x x x x x x-----x x x x x x i r f a f q t s I T V L C I A
C P C S L G L A t P T A V M V G T G-V A a q n g-----

-----i L I K-G G K P L E M A H K I K T V M F D K T G-----
-----T I T H G V P R V m-----r v l l l g d v a-----

-----x x x x x-----x-----

-----v l a v v-----g t a e-----

-----a s s e h p l g-----v a v t k y-----c k x x-----
-----x x-----t e t-----x x-----

-----y c t d f q a v p g c g i g c-k v s n x x x x x x x x x-----

-----x x x x x x x x x x x x x x x x x x x x-----x-----x-----
-----i-----

-----g n r-----
e-----w l r r n g l t i s-----

XXXX

xxkh-ktxnmdvli vlattiafaysli
illv-----xxxxx-----akv---npitffdtppm
lfvf-i-----algrwlehiak-----gk-----ts---ea
laklislqat-----

-----eatxvtl-----
xxxnillx-----xxx-----v
d-----
---veIVQRGDIIKVvp-----
---GGKFPVDGRVleg-----

-----xsmVDESLITGEAMPVAKkx-

-----x-----

-----STVIA--GSIN-----
qn---gsll-----iCATHVGADTTLSqivklvee-----

-----aqtskapiqqfadklsgyfvpfivfvsiatl
-lvwivigflnfeivexxxxxxxxx-----xxxxxiirfafqasITVLCIA
CPCSLGLAtPTAVMVGtG-VGaqng-----

-----iLIK-GGEPLEMAHKVKVVVFDKTG-----
-----TITHGTPVn-----qvkvltesn-----

-----xxxxx--x-----

-----ilaiv---gtae-----

-----snsehplg---tai tky---ckxx-----
-----xx-----tet-----xx-----
-----tcidfqvvpgcgisc-kvtnxxxxxxxxxxx-----
-----x-----xxxxxxxxxxxxxxxxxxxx
xx-x-----x-----
-i-----gnr-----
e-----wmirnglvin-----
-----xxv-ndf mteh-erk-----grtaVLAPILdx-----
-----|CGLIAIADTVKPEAELAIHILKSmg-LEV-----
VLMTGDNSKTARSIASQVGI-----tk-----

VFA-EVLPSHKVAKVKQLq
ee-gk-RVAMVGDGINDSPALAMANVGIAI
gtgtdv

AIEAADVVLIr-NDLLDVVASIDLSRKT VKRI RINF-V

xxxxxxxxxxxxxkratptpppsyaqngsavaipveqel-----
-----ltkcfihirgmtcascvaai--

-----ekhckkiygldsilvalaakaevkfnanvvtae-----niaksi
telgfptelix-----

-----xxxxxxxxxxxxxxxxxtcascvknieshv-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx
xxxxx-----lmtgrdkmahnylehkeei-----
-rkwrnaflvslxxxxxxxxxxxxxxxxxxxxx-----xxxxxxx
xxkh-gtxnmdvlismvttisyvysva
vvia-----xxxxx-----qns---spltfddtppm
llif-i-----slgrwlehiak-----gk-----ts---ea
lsklslkaa-----

-----dalxvei-----
xxxfdixx-----xxx-----i
s-----
----vdyVQRGDILKVip-----
----GAKVPVDGKVLyg-----

-----xssCDESLITGESMPVAKr--

--x-----
-----x-----SVVIG--GSIN-----
qn---gvll-----vEATHTGENTTLAqivr lvee-----

-----aqtskapiqqladriagyfvpfvvvvssitl
-iawiiigfsnpnlvpxxxxxxxxx-----xxxxxivsyafkcaLSVLAIA
CPCALGLAtPTAVMVATG-TGaing-----

-----vLVK-GATALENAHKVKTVVFDKTG-----
-----TITHGTPMTs-----kvtlfvtaq-----

-----xxxxx-x-----

--altiv--gaae-----

-----qnsehpia--saivhf--akxx-----
-----xxx-x-xxxags-----xx-----

-----ksshfqavpgcgirv-tvsnxxxxxxxx-----

-----xxxxxxxx-----
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-x-----x-----
-i-----
-----gnr-----
e-----wmernaievp-----

-----xxi-sdcmthe--erk--ghaVLCALNg-----
-----x|VCMFAVSDMVKPEAHLAVYTLKRmg-IDV-----
VLLTGDNKNTAASIAREVG|-----rt-----


```
mXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

[illegible]

xxx--xxxxxt-yqylsy--snsxxxxsnniIFMCIEgx-----
-----vVGFFTLVDNIKPEVFELINFLKRek-KKV
YVCTGDNYMNALYISKILGI-----kkx-----

-----xVSS--NTLPLEKVQFVKKVq-----
--sm-xdg-----KVCMI GDGINDCFALKTADLGLSL--
-----ctrtnv-----

-----VMDSADACIVd-NNINVIIkIFEISRKTLLVIKFNf-----L
fsf-finxf-----

--XXXXXXXXXXXX--

---xxvfspflftflmfcsxi i-----XXXXXXXXXX--

```

m-----X
XXXXXXXXXXXXXXXXX---XXX---XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXX-----
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-----
-----
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX-----XXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----xxraaiedmgxdaf|-----
-----xxxx|xpsvkvksp---lsvrsss|spvr savkeneaXXXXXXXXXX-----
-----iskcfiqiggmtcascvani-----
-----ernlkneyghsvlvalmaskaevryspsvldpl-----riaeli
relgftatvmx-----
-----xxxxxxxxxxxxxxxxxtcascvhkiesnl-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----XXXXXXXXXX
xxx-----aslvkkdrpgshldhsrei-----
-rqwkrsfqis|xxxxxx-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

```

xxkh-rtxnmdvli vlattiaftysv
vllv-----xxxxx-----akv---npitffdtppm
lfvf-i-----slgrwleqia-----sk-----ts---ea
lsklmslqat-----

-----eatxvtl-----
xxxmsvxx-----xxx-----v
d-----
---veIVQRGDVVKVvp-----
---GGKFPVDGRVleg-----

-----xsmADESLITGEAMPVTKx-----

-----x-----

-----STVIA---GSIN-----
qn---gsll-----iKATHVGTDTTLSqivklvee-----

-----aqtskapiqqfadkissyfvpfi vvisvltl
-lawi i igfvnfslvqxxxxxxxxx-----xxxxxxvirfafqasITVLCIA
CPCSLGLAtPTAVMVGtG-VGaqng-----

-----iLIK-GGEPLEMAHKIQSVVFDKTG-----
-----TITYGAPKVv-----qvkm laegn-----

-----xxxxx---x-----

---llaiv---gtae-----

-----xxxxxv-ssvsqmpsglkhl-psqrhpskpspspitkxxxxxxxx-----
-----l rkcfvhvtgmtcascvsni-----
-----ernlvkhegiksvlvalmagkaevkydpglldpa-----qivqli
shlgfgasvmx-----
-----xxxxxxxxxxxxxxxxxtcascvhnieskl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxx-----
xxx-----vsl ikneglnntldhqueei-----
-rqwkhsflfslxxxxxx-xxxxxxxxxxxx-xxxxxxxxxxxxxxxx
xxrh-gvxnmdvli vlattiayvysft
vli v-----xxxxx-----akq---spltfddtpm
lfvf-i-----algrwlehvsk-----ts---ea
laklmslqat-----

-----datxvsl-----
xxxntixx-----xxx-----v
s-----
----vdIVQRGDVVKVap-----
----GGKFPVDGKVleg-----
-----xsmADESLITGEPMPVlKkx-----
-----x-----

-----SCVIA--GSIN-----
ah---gall-----vEATHVGSETTLsqivklvee-----

-----aqtskapiqqladklsgyfvpfivvisiltv
-tawli igfldfdvvsxxxxxxxx-----xxxxxivr fafqasITVLSIA
CPCSLGLAtPTAVMVGTVGaqng-----

-----iLIK-GGEPLEMAHKVGAVMFDKTG-----
-----TITNGVPQVt-----rvlvldra-----

-----xxxxx-x-----

-----vlavv-----gtae-----

-----assehplg-mavakh-----ckxx-----
-----xx-----aet-----xx-----

-----fchdfqavpgcgisc-kvssxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxx-x-----x-----
-----i-----
-----gnr-----
q-----wmlrnglevt-----

-----xxv-dnamssh-etk-----gqta|LVAIDgx-----
-----|CAMIAVADTVKAESALAVHTLSSmg-IEV
YMITGDNRRRTARA|ATQVG|-----rk-----

-----VFA--EVLPSHKVAKVQELq-----
--er--gl-----KVAMVGDGVNDSPALAHADLGIAI--
-----gtgtdv-----

-----AIEAADIVLlr-NDLLDVasIELSKKTQVRIRINF-----V
fal-yn-l-lgi-----x-----
-----faagvfmp|---x-----|v|qpwm---g---saamaass
v-----

sv---v|ss||lr-----

|
>cell_IB201 NP_499778.1
m-----

-----xssVDESFITGESMPVVKx-

-----x-----

-----STVIG--GSVN-----
qk---gvli-----vKATHVGNDSTLSqivr lvee-----

-----aqtnrapiqqladkiagyfvpfvivlsiftl
-gvwiyieynsarnanxxxxx-----xxxxalkiafeaalTVLAIA
CPCSLGLatPTAVMVGtG-VGaang-----

-----iLIK-GGEPLESVHKVTTIVFDKTG-----
-----TITEGRPRVv-----qiasfvnps-----

-----xxxxx--x-----

--itfls---gate-----

-----alsehpig--navaaf---akxx-----
-----xx-----ept-----xx-----

-----ntsrfhvsaghgvtc-ridsxxxxx--xxx-----

-----x-----xxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-x-----x-----
-i-----
-----gte
r-----mmerhgi pvs-----

-----xxv-kmtlsee--qrk-----ghisVICAIna-----
-----xvVAVISIADQVKKEASLAIYTLREmg-LRV
VLLTGDNSKTAESTAKQVGI-----de-----

-----VFA--EVLPNQKQKIKQLk-----
--gy--kn-----KVAMVGDGVNDSPALAEANVGIAI--
-----aagsdv-----

-----AIESAGIVLvr-NDLVDVVgaIKLSKMTTRRIRLNF-----L
fai-yn-a-igi-----x-----
-----iaagvfrpf-x-----fmlqpwm--a--aaamalss
v-----

sv---vsssl||knfrkpt-ia-xxxxxxxxxxxxxxxxxx---xxxxxxxxxxxxxxxxxx
xxxxx-----xx-----xxxxxxx-----
-----xxxxxxx---xx-xxxxxxxxxxxxx-----
-----xxxxxxx-----

-----xxx-----

```
v>cnel_IB201_XP_568603.1  
m-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----xxgspphrqrzasnsxxxx  
xxxxxxxxxxxxtxprveqrvlleedevpleegsqslskeapvg-----  
-----lrrvelrvggmtcgacvasi--  
-----esqlkqpigikisqisl laergvveydenfvkad-xxxxxxkiaeei  
edigfeatvvx-----  
-----xxxxxxxxxxxxxenqeivsslstt-----  
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----  
-----  
-----xxxxxxxxxxxxxpvsnnddsqi asl qkhkea-----  
-alwkrtilf|saXXXXXXXXXXXXXXXXXXXXX-----XXXXXXXXXX
```

xxkh-gsxtmdv|vv|gtssafcysv|
amff-----xxxxxx-----pdy---rpqtfddtstm
litf-v-----slgryieniak-----gk-----ts---aa
ltdllsltps-----

-----sat-iyv-----xxxxxxxxxx
xxxaktxx-----v
p-----
----te|VQVGDVLLvp-----
----GEKIPADGTVLtg-----

-----xx-----sVDESMVTGEALPMPKtx-

-----x-----

-----SQVIG--GTVN-----
----xxgtit-----FRVTRAGADTALSqivklved-----

-----aqtskapiqefadvagifvpivitlslstf
-viwmiislssygs|xxxxxx-----xxxrfgvc|klclSVVVVA
CPCALGLStPTAVMVGTVG-VGakng-----

-----iLIK-GGKALEACKGVKRVVLDKTG-----
-----TVTEGRMAVv-----svvwassss-----

-----xxxxxxxxxx
xxxxxxxxxxxxx-----
-----xx
xxiisli----slae-----

wac-cyn-v-lmi-----x-----
-----|amgv||pw-x-----ih|hpmm---a-xxamafssvs
v-----

V

[illegible][illegible][illegible]

xxxxxx---xxxxxxvqavgdspgsvqnmasdtrgl|lthqgpgylsxxxxxxxxxx---
-----sqkcfvqikgmtcascvsni---

-----erslqrhagilsvlvalmsgkaevkydpeviqsp-----riaqli
edlgfeaaix-----

-----xxxxxxxxxxxxxxxxxtcascvhnieskl-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx
xxx-----aslahrnpnahhl dhktei-----
-kqwksf|cs|xxxxxx-xxxxxxxxxx-----xxxxxxxxxx
xxrh-ksxnmdv|ivlattiayayslv
i|vv-----xxxxx-----aek---spvtffdtppm
lfvf-i-----algrwlehvak-----sk-----ts---ea
laklmslqat-----

-----eatxvtl-----
xxxnlix-----xxx-----v
p-----
---me|VQRGD|IKVvp-----
---GGKFPVDGKVLeg-----

-----xtmADESLITGEAMPVTKkx-

-----x-----

-----SIVIA---GSIN-----
ah---gsvl-----iKATHVGNDTTLAqivklvee-----

-----aqmskapiqq|adrfsgyfvpfiiiistltl
-vwwiigfvdfg|vqxxxxxxxx-xxxxxiirfafqtsITVLCIA
CPCSLGLAtPTAVMVGTVAAqng-----

-----vLIK-GGKPLEMAHKIKTVMFDKTG-----
-----TITHGVPRVm-----rfllldva-----

-----xxxxx-x-----

-----vlavv-----gtae-----

-----assehplg-vavtky-----ckxx-----
-----xx-----tet-----xx-----

-----ystdfqavpgcgisc-kvsnxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxx-x-----x-----
-----i-----
-----gnr-----
e-----wmrrngltis-----

-----xxi-sdamtdh-emk-----gqtaLLVAIDgx-----
-----ICGMIAIADAVKPEAALAIYTLKSmg-VDV
ALITGDNRK TARAIATQVGI-----nk-----

-----VFA--EVLP SHK VAKVQELq-----
 --nk--gk-----KVAMVGDGVNDSPALAQADVGIAI--
 -----gtgtdv-----

```
sv-----v|ss|q|kcyrkpd|-e-xxxxxxxxxxxxxxxx-----xxxxxxxxxxxxx
xxxxxxxx-xxxxxxx-----xx-xxxx-----
-----xxxxxxx--xx-xxxxxxxxxxx-----
-----xxxx-----
```

-----XXXX

-----XX
XX
XX
XX
XXfsktcgtfxfkvgxxxx
XXXXXXXXXXXXXXXXXnglstnnnvsie|lpitttnfnkstgikssxxxxxxxx-----
-----kvelhlmisgmtcadcvttl-----

-----eqkmks|sgvneiqtstlftgkckinyspmi|qpqxxxxxxxxxigfvgk
qvhgqssnsnx-----
-----xxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx|daieesgsvndk-----

-----xxxxxxx
xxxxxxxxxxxxxxxxxxxxk|qpntk|nnnnnsnnknnxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xtilisyifpni-----xxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx|yxrksmdl|vmtsstiafyfsl
n|l|-----xxxxs|n---yngpi|fetcv
i|l|txi-----i|grylehlak-----sk-----asxxxxek
mkq|dssnai-----

-----xx
xxxxxxxgsexeim-----
-----i
e-----
-----kel|EKGD|LKV|p-----
-----FTKIPTDGI|lrg-----

-----x--xgyIDESIITGEANHVKr--

-----x-----
-----x-----DYVFG--GTMN-----
qk---gcl i-----iKVTKHSNDTALSni iklvee-----

-----sqsikpnfqnyadlvasyfvptilicsiitf
-i vwfclihynvviat-----xxxxaftfaikisMSLMVIS
CPCAI SLAtPTSIMVGSAlGakkfx-----

-----i LFKxGGQVIELASKVNKVI FDKTG-----
-----TLTTGEIDIn-----hfsiydqi-----

-----XXXXXXXXXXXXXXXXX--XXXX
XXX-----
-----xx
xxq|snn---nnki-----

-----dscqsplq--ssqlin---skxxxxxx
XXXXXXXXXXXXXXXXXXXXX-x-xxxccp-----xx-----

-----aappistgnsgdckkxccpsxxxxxxxxx-----

-----XXXXXXXX-----

-----CXXXX--XXXXXXXXXXXXX-----
-----gcc
s-----sssq|sksq-----

xxx-xxxxxi-qndikl-enq-gktvILVSMNe-----
-----xi|GLVSLSDKLKPEAKKV|SKLKNg-IDV
WLVSGDNKRATQS|GEQLNI-----nsx-----

n

>ddil_IB203_XP_644796.1

m

-----XX
XX
XX
XX
XXqkqkqqqxtstvx
XXXXXXXXXXXXXXXXXdxssitkspfepissdeevveinnnnkynnsxxxx
xxxxxxx-----ieiisigvfgmtcascvgmv-----

-----ehsiksvdgiecnvnl laeraeikynssickdvxxxxxxilg
fetiqliqqskagtx-----

-----XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXsssqkknknkn-----

-----XXXXXXXXXXXXX-----XXXXX
XXXXXXXXXXXXXXXXXXXXetddiknsImrkreikkwXXXXXXXXXXXX
Xksikflhyqla-----

-----xxknxhg-nmdllvavgstcayvysvi
siii-----xxx-----npm---yeamhffetsa
slitxi-----ilgrwleniak-----gh-----ts---sa
ivklmnlqsk-----

-----ettxvtl-----xxxxxxxx
xxxapixx-----xx---xxx-----i
q-----
----sslISYGDLLKVip-----
----GQSIPTDGIVIng-----

-----xssCDESMITGESIPVLKk--

-----x-----
-----x-----DSVTG--GTLN-----
ld---gvli-----iKANKIGSENTLSqii glvqq-----

-----aqtskapiqqladtiskyfvpiiii glitf
-giwiavtetnsvsaeex-----xxxpflysflitalSVIVIA
CPCALGLAtPTAVMVGtG-VGasig-----

-----iLIK-GGKPLETAHKATAILFDKTG-----
-----TITTGKMNvt-----dyrvnhqsn-----

-----xxxx
xxxxxxxxxxxx-----

-----xx
xxffkiv---gaae-----

sgsehpig—kaivqf—ckxx—
xxxxxxx—xxxspm—
xxxxxxpvsdfkgiagrglsc—ivds—
xxxx
xi—
gnl
s—fmkdnsinvp—
xxf—velaqsw—etn—gktvlYVSYGdx—
xxxxxxxxxxxxxxfKGIMSDIPRDDSKRAIKKLKSmg—LKC
YMTGDNKRAAKFIANQVGIdex—
xIYS—EVIPKEKAEKVSDLq—
asxx—VVCFVGdGVNDSPALSQADVGISV—
atgtdi—
AIESSIVLLk—NSLTDVYrsIHLSRVVFRRIKINF—T

la| - i yn | - cav ----- x -----
----- laag | fr v i - xx ----- vs | ppma ----- a ----- aaamvvss
| -----

sv---|sss||k|yssp-----

```
>ddiI_IB204 XP_638720.1
```

m-----

```
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxsvgmtcs-scvgxxx
```

xxxxxxxxxxxxx|xqetaevkfnpl|l seddiveqismvgfeakxxxxxx-----
-----nntivlnigmtcsscvgi--

-----enyvsnvdgviecrvnlametarvvypdltgvrxxxxx-xxdvghta
qipsqnfddt-----

-----kniqkeeaeklkxxxxxxxxxxxxxxxxxxxxxx
xsffnflytnni-----
-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkxhga-nmdvlvalgtscayfyslm
vllmxxxxxx-----gst---vgmktffdt
slitxi-----llgkyleviak-----gk-----ts---ea
ikkimglqat-----

-----kalxlti-----xxxxxxxxxxxx
xxxtttxx-----xx---xxx-----i
d-----
----idIVQRGDYLVKVP-----
----GSKVPTDGLVVsg-----

-----xshIDESIITGESLPVSKx-

-----x-----

-----DKLIG--GTLN-----
qk---gvlv-----mKATRIGGETSLSqiklvek-----

-----aqterapiqsladkvsgyfvpsvitlglltf
-ivwliagssgvasdyxxx-----xxxvfqfalrnlSVIVIA
CPCALGLAtPTAVMVGtG-I Gaqng-----

-----iLIK-GGSHLETAHKISAIIFDKTG-----
-----TLTTGKPIVs-----nvnifgnln-----

-----xxxx
xxxxxxxx-----
-----xx
xxffqmv-----asae-----

-----aasehpla-gaivny-----afxx-----
-----x-xxxstt-----

-----pplsfesitgsgira-tlapxxxxx-----

-----x-----
-i-----
-----gnl
k-----wiksegisydxxxxxxxxxxxxxxxxxxxxx-----

xxxxxxxxxxi-edqvrri-esd-----gntvVYVVIDrx-----
-----IMGYIAISDQLKPEAHATITELNKmg-ICT
WMVTGDNPRTANAIAQQVGI-----dq-----

-----VFA--EVLP SNKSKKVMELk-----
 --km-gh-----TVAMIGDGINDSPALAEADVGIAI--
 -----gagtdi-----

```
sv-----v lss l h l k t y q k p d x p i -xxxxxxxxxxxxxxxxx-----
-----xx-----xxxxxxx-----
-----xxxxxxx-----xx-----xxxxxxxxxxxxx-----
-----xxxx-----
```

-----XXXX

m-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX--

-----xxxxxgvtgmtca-acsnxxx
xxxxxxxxxxxxlxqnradvfdpnlvkeedikeaidagfeaaxxxxxxx-----
-----tlvgqftiggmtcaacvnsv--

-----egi lrdlpgvkra vvalstslgeveydpnvinkdxxxxx-xxdagfeg
slvqsnqqdk--

-----xxxxxxxxxxxxxxxxxgil tr lngvrqfr-----

-----xxxxxxxxxxxxxxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxmspyer lsskdtgeasnmfxxxxxxxxxxxxxxxxxxxxxx
xal fdallvwrc-----
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxrnxst-nmdvl val gtsasyfy svg
ally-----xx-----vtg----fwsptyf dasa
ml itxv-----ll gkyes lak-----gk-----ts----da
mkklvqltpa-----

-----tai-l lt-----
-xxkggx-----xx---xxx-----i
d-----
--a l l IQPGDTLKVhp-----
GAK I PADGVVVwg-----

-----x-----syVNESMVTGESVPVSKex-

-----x-----

-----SPVIG--GTINxx-----
-----galh-----mKATKVGSDAVLSqiislvet-----

-----aqmskapiqkfadyvasifvpvvitlaltl
-vgwsiggavgaypdexxx-----xxxxhfvfslmfsISVVVIA
CPCALGLAtPTAVMVATG-VGatng-----

-----vLIK-GGDALEKAHKVKYVIFDKTG-----
-----TLTQGKATVt-----ttkvfsemd-----

-----x
xxfltlv----asae-----

-----assehpla--kaiway----arxxxxxx
x--xxxx-----xxxxxxx--xxxsgw-----xx-----

-----dtsdfsalpgkqiqc-lvne-----

-----xx--x-----x-----
-v-----
-----gnr
k-----lmsenainip-----

A series of horizontal lines for handwriting practice, consisting of four sets of three lines each (top solid, middle dashed, bottom solid).

>athI_IB202 NP_974675.1

m

```
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx|rs|gaavxpvirxxx
xxxxxxxxxxxxxgxsfggyngsgggggsgsesgdsksk|gaxxxxxxxxxx-----
-----sdi|l|dvgmtcgcsasv-----
```

-----k k i l e s q p q v a s a s v n l t t e t a i v w p v p e a k s v p x x x x x x t l a n h l
t n c g f q s t p r x-----

-----lvtenffkvfetk-----

```
-----tkdkqar lkesgre l avswxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xai hstgfhvsl-----
```


-----xxxxxxxxxxxxxxxxxxxxk-gsxnmntlvglgalsfsvssl
aami-----pkl---gwktffeevvm
liaf-v-----llgrnleqrak-----ik-----at---sd
mtgllsvlps-----

-----kar-lll-----
---dgdx-----xx---xxx-----v
p-----
---cnsLSVGDLVVllp-----
---GDRVPADGVVKsg-----

-----xstIDESSFTGEPLPVTKe--

-x-----
-----x-----SQVAA--GSIN-----
ln---gtlt-----vEVHRSGGETAVGdiirlvee-----

-----aqsreapvqqlvdkvagrftygvmlsaatf
-tfwnlfgahvlpal-----xxxxpmslalqlsCSVLVVA
CPCALGLAtPTAMLVGTS-LGarrg-----

-----ILLR-GGDILEKFSLVDTVVFDKTG-----
-----TLTKGHPVvt-----eviiipenpr-----

-----xxxx
xxx-----
-----xx
xxvmla---aave-----

-----snthpvg--kaivka---arxx-----

xxxxxxxxxxxxxxxxnraqilfypnsvdvetireti edagfeasxxxxxxxx-----
-----rqvcriringmtctscssti-----

-----ervlqsvngvqrahvalaieeaeihydprlssydxsxxx-xxnagfea
vlistgedvs-----

-----xxxxxxxxxxxxxxxxxxxxrslealpgvqsve-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxsegvgresqkqgeikqyyxxxxxxxxxxxxxxxxxxxx
xpgikdlImfkv-----
-xxrxxsa-nmdvli algt naayfysly
tvlr-----xxx-----spd---fkgvdf fetsa
mlisxi-----ilgkylevmak-----gk-----ts---qa
iaklmnl apd-----

-----taixlsl-----
--xkegxx-----xx---xxx-----i
d-----
---grllQKNDVlKlvp-----
---GAKVASDGYVlwg-----

-----xshVNESMITGEARPVAKr-----

--x-----
-----x-----DTVIG---GTLN-----
en---gvlh-----vKVTRVGSESALaqivr lves-----

-----aqlakapvqkladriskffvp lviflsfstw
-lawfl agklhwypesxxx-----xxxxsfelalqfglSVMVIA
CPCALGLAtPTAVMVG TG-VGasqg-----

-----vLlK-GGQALERAHKVNCIVFDKTG-----
-----TLTMGKPVVv-----k t k l l k m v-----

-----x
xxfyelv-----aate-----

-----vnsehpla-kaivey-----akxx-----
-----xx-xxxnpa-----xx-----

-----eacdfvsi t g k g v k a - t v k g-----

-----xx-x-----x-----
-v-----
-----gnk
n-----lmndhkv i p-----

-----xxa-eel l a d s - e d m - - a q t g l V S I N s-----
-----x l I G V L S V S D P L K P S A R E A I S I L K S m n - I K S
I M V T G D N W G T A N S I A R E V G I-----ds-----

-----VIA--EAKPEQKAEKVKElq-----
--aaxx-----VVAMVGDGINDSPALVAADVGMAl--
-----gagtdi-----
-----AIEAADIVLMk-SNLEDVItaIDLSRKTFSRIRLNY-----V
wal-gyn-l-mgi-----x-----
-----iaagvlfpg-xx-----frlppwi--a--gaamaass
v-----
sv----vccslllknykrpkxld-xxxxxxxxxxx-----

v
>athl_IB204 NP_001031920.1
m-----

-----asnllrfxpppsxxxx
xxxxxxxxxxxxxxxxxsrirrhcsrpfflvnsnsveistqsfestesxxxxxxxxxx-----
-----dtpilldvsgmmcggcvarv-----
-----ksvlmsddrvasavvnmltetaavkfkpevevtaxxxxxxxxxrltesg
feakrrvsgmx-----
-----xxxxxxxxxmvskkedllvksr-----
-----xxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxavgallgpgrellfdgika-----
-----fgxrsxnmnslvglgsmaafsisli
slvn-----xele-----wdasffdepvm
llgf-v-----llgrsleerak-----lq-----as-----td
mnelislist-----
-----qsrxxvit-----xxxxx
xxxdsvxx-----xxxxxxx-----v
s-----
vddlRVGDSLLVlp-----
GETFPVDGSVLag-----

-----xsvVDESMLTGESLPVFKex-

-----x-----CSVSA--GTIN-----

wd----gplr-----iKASSTGSNSTISKivrmved-----

-----aqgnaapvqrladaiaqpfvytimsIsamt f

-afwyyvgshifpdvIxxxxxx-----xxxxaIalsIkIaVDVLVVS

CPCALGLAtPTAILIGTS-LGakrg-----

-----yLIR-GGDVLERLASIDCVALDKTG-----

-----TLTEGRPVS-----gvaslgy-----

-----xx

xxvIkma----aave-----

-----ktathpia--kaivne----ae-----

-----x--xxxktp-----x-----

-----trgqltepgfgtlaexdgrf-----xx-----

-v-----

-----gsI

e-----wvsdrfIkknxxx-----

xxxxxxxxxxk-lsntsst--sry---sktvVYVGRE-----
-----xxx i lGA lA lSDCLRQDAEFTVARLQEk g-IKT
VLLSGDREGAVATVAKNVG l-----ksx-----

-----xTNY--SLSPEKKFEF lSNLq-----
---ssxx-----RVAMVGDG lNDAPSLAQADV G lAL--
-----xxeaqena-----

-----ASNAASV lLVr-NKL SHVVdaLSLAQATMSKVYQNL-----A
wai-ayn-v-i si-----x-----
-----i aagv l l p q-xx-----famtps l--s--gg lmalss
i-----

fv---vsns l l l q l h k setxkn-----

```
|
>osal_IB201 NP_001046033.1
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xxx

xxxxxxxx xxxxxxxxxxx

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edagfeaal|x-----xxxxxxx-----
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xxxxxx-----ahvqnpyi raasndaqea-----
-skmlhl|lcss|xxxxxxxxxxxxxxxxxxxxxx-----xxxxx
```

xxrh-gsxnmv|vv|gttasyvysvc
ally-----xxxxx-----f---hppkyfetsam
iitfv-----lfgkylevlak-----gr-----ts----da
ikklve--lv-----

-----pat-all-----x-----xxxxxxxxxx
x--eke-----i
d-----
---as||QPGDVLKVlp-----
---GSKVPADGTVVwg-----

-----x-----shVDESMVTGESAPI SKex-

-----x-----

-----SIVIG-GTMNxx-----
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-----x
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fam-ayn-i-iai-----x-----

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v-----

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-----xxxx

a

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ivlk-----xxxses---fegqdf fetsa
mlisxi-----llgkylevvak-----gk-----ts---da
lskl telape-----

-----tacxltl-----
xxxgnaxx-----xxx-----i
s-----
---tq|LQRNDV|K|vp-----
---GEKVPVDGVV|k-----

-----x-x---shVNESMITGEARPIAKkx-

-----x-----

-----DKVIG--GTVN-----
dn---gci i-----vKVTHVGSETALSqivqlvea-----

-----aqlarapvqkladr isrffvptvvvaaf|tw
-lgwfvagqfdiyprexxx-----xxxsfelalqfglSVLVVA
CPCALGLAtPTAVMVATG-KGasqg-----

-----vLlK-GGNALEKAHKVKAlIFDKTG-----
-----TLTVGKPSVv-----qtkvfskip-----

-----x
xxlcdla-----agae-----

-----ansehpls-kaivey-----tkxx-----
-----xxxx-xxxxsdh-----xx-----

-----eskdfevhpgagvsa-nveg-----

-----xx-x-----x-----
-v-----
-----gnk
r-----lmqefevpis-----

-----xxv-eghmset-eel-----artcVLVAIDrx-----
-----iCGALSVSDPLKPEAGRAISYLSSmg-ISS
IMVTGDNWATAKSIKEVGI-----gt-----

m-

[illegible]

-----xx-----fVDESMLTGESLPVPKex-

-----x-----FPVFA-GTVN-----

wd----gplk-----iKATTGPSSTIAkivrmved-----

-----aqareapvqrladsiagpfvytvmI saatf

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CPCALGLAtPTAILIGTS-LGakrg-----

-----ILIR-GGDVLERLAGIDAIVLDKTG-----

-----TLTKGRPVVt-----siaslay-----

-----xx

xxilrla----aave-----

-----ktalhpia--naimee----ae-----

-----x-xxxdip-----x-----

-----tsgqltepgfgclaexdgcI-----xx-----

-v-----

-----gtI

d-----wvhnrfetkaxxx-----

xxxxxxxxxx--vssseas--snh---sksiAYVGRE-----
-----xxx i l G A l A V S D V L R D D A K A T V D R L Q Q e e - I L T
F L L S G D R K E A V E S I G R T V G I -----r s x-----

-----x I K S--S L T P H E K A G I I T A L q-----
--ge--gr-----RVAMVGDG I N D A P S L A A A D V G V A M--
-----xxnskesa-----

-----ASDAASVLLg-NRLSQVMdaLSLSKATMAKVHQNl-----A
wav-ayn-i-vai-----x-----
-----i a a g v l l p q - x x -----f a m t p s l ---s - x x g k t t g r s e
l-----

qa---e l n l a d r i k f g p v x i s x x-----

p

>osal_IB204 NP_001058305.1

m

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX--XX-XXXXXXXXXXXXXXXXXXXX

XX

-----XXXXXXXXXXXXXXXXXXXX-----

---XX---XX

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-----ixdtai sqpkaqktl saq-----

-----fr iggmtcancvnsv-----

-----egi lkr lsgvkgavvalats lgeveyd-psv ink-----xe ivea i

edagfeaaf lx-----xxxxxxx-----

-----xxxxxxhterdvnlhdi l-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXX-----

xxxxxx-----ahvqnpyar gasndahea-----

-akmlhl l rsslxxx-----

fam-ayn-v-vai-----x-----

-----vaagalpf-xx-----lqmpwl---a---gacmafss

v-----

sv---vcssllrryrkprxtt-xxxxxxx-----

-

>tanII_IIA101 XP_952193.1

m-----

-----xx-----

-----xxxxxxx-----

-----x
phvydssevlk-----

-----hys-----vnl dyg lndeq-----

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-slhlfiqq-f-----
-----ddllvkillsaa--ivsff
ftcx-----xxx-x-----t--knissfiepiv
ilfi-l-----ilnalvgvwqe-----an-----ae--ka
ldalkk--lq-----

-----ptl-ttc-----
-----lrn-----gvxxt-----f
d-----
----tenLVGDIVKVkn-----
----GDKIPADLRLVkv-----

-----xxxx-----IIVEQSQLTGESLLIYKtt-

-----xxxxxxxxxxxx
xxk-----
-----r-----NILFG--STTV-----
cs--gtgi-----gVVAVGMDTEIGtiqsaviexx-----

-----tenttqlqkmlhdfgnslskaisvicllvw
-linvknfnxxxxxx-xxx-----gsiyyfkialALAVAA
IPEGLPAViTTCLALGTR-KMakkn-----

-----a lVR-KLPSIETLGCTTVICSDKTG-----
-----TLTTNKMTTv-----vvn lfnqqn-----

-----xxxxxxxpxxx
xxxxxtmggfgexxxxxxxxxxxxxxxxxxxxx-----
-----tf
lkcaslc-----sdvt-----xxx--xx
xxxxxxxxxxxxsxxdxgl-----

-----v legepte--vai iemxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxennssni--kkmkxx-----xxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-x
xxxxxxxxxxxyl ikeat lefcrsrk-mmsvxxxxxxxxxxxx-----

-----x--xx--xxxxx--xxxxxxxxx--
-s-----k-----
-----gap
e-----s i levctsym lpdgx-----

vnk lsksektei-l dhvkq l--ane----a lrvLAFSYRsa-----
x-----xxxxxtmknnsvfsk-iekdmvfLGLVGIMDPPRPEVKDSISKCMRag-IRV
IMITGDNKLTAEAIARKVGI-----ikixxs-----

-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxss l t gkefe-----

-----s l tqdaqrk-----

l|tts-xIVFS--RTEPKHKQSIVSILk-----
--dl--ge-----IVAMTGDGVNDAPALKMADIGISM--
-----xingtev-----

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nlvtdgppatalgfnppd-pl-----vmkkgpr--h-rndklidrtt
l-lrymvigly--vglatcgifixxxxxx-----xx
xegntlxxxxxxxxxxxxxx-x-----xxx-----xxx-xxxxxxxxxxxxxx-
kv---kastlslttlvilemfn-alnalse--dssil--xx--ppxsnpylicaiffs
ilihcfil--yixxfss-----lfnvvpI-----
-----dvydwk---wv--liwsfpvliid-----
-----ecfkIc-----

-----krsyx-----xxxxxx-----xxx
xxxxxxxxxxxxxxxxxx-----

-----xx-----
-----xxxxxxxx-----

-----xxxxx

y
>ggall_IIA101 XP_415130.2
m-----

ahtktveevla
 yfg vnestglsleq
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 tlelvieqf
 edllvrilllaa cisfv
 lawx xxge etitafvepfv
 illi-l vanaivgvwqe rn ae na
 iealke ye
 pem gkv
 yrq drxxvqr i
 k
 ardiVPGDIVEVav
 GDKVPADIRITsi

-----x--x-t--tlrVDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
aa--gkam-----gVVIATGVNTEIGkirdemva-----

-----teqertplqqkldefgeqlskvisliciavw
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IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----rmfildkve-----

-----xxxxxxxx
xxxxxapmgevxxxxxxxx-----
-----el
aticalc-----ndss-----
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-----ekvgeate--talctl-----xxxx-----
-----xxxxxxxxxxxxieranac--nsvixx-----

-----lmkkeftlefsrdrk-smvsvxxxx-----

-----xxxxxxxx-xxx-----
-v-----k-----
-----gap
e-----gvidrothrvvгна-----

kiplssgikqki-msvirewxxgrd---tlrcLALATHdn--x-----xxx---
-----xxxnledssnfin-yetnltfVGCVGMLDPPRIEVASSIKLCKQag-IRV
IMITGDNKGTAVAICRRIGI-----fvexxd-----

-----xxx-----
-----kaftgrefd-----

-----elslaaqr-----

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-----gsgtav-----

-----AKTASEMVLAd-DNFSTIVaaVEEGRAIYNNMKQFI-----R
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nlvtgdglpatalgfnppd--ld-----imnkppr--n-pkeplisgw
f-frylaigcy--vgaatvgaaaxxxxxx-----
-ggprv-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxx---
sp---ypmtmalsvlvtiemcn-alslse--nqslm--xx--ppxeniwlvgaicls
mslhflil--yvxxlpi-----ifqitpl-----
-----nvtqwl---mv--lkislpvilld-----
-----etlkv-----

-----arnyl-----

-----XXXXXX-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXX-----

-----XXXXX

S

>gga||_||A102 NP_990222.1

m-----

-----XX

ahsvpqdvls-----

-----rfg-----vaescg|speq-----

-----vrrnrekypne-----

-----i
lawx-----xxge--esttafvepiv
iimi-l-----ianavvgvwqe-----rn-----ae--sa
iealke--ye-----

-----pem-gkv-----
-----ira-----drxxvqr-----i
r-----
-----ardIVPGDIVEVav-----
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-----xxxxxxxx
xxk-----
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aa--gkav-----gIVIATGVYTEIGkirnqmve-----

-----tepektplqqkldefsqqlskviflvciavw
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-----lmrkectlefsrdrk-smstvxxxxx-----
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-v-----k-----gap
e-----sviercthvrvgta-----

kvpltppvreki-lsqirdwxxtgd---tlrcLALATHda-x-----xxx-----
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IMITGDNKGTAVAICRRIGI-----ftexxd-----

-----xxx-----
-----kaytgrefd-----

-----el speaqrq-----

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--sf--se-----ITAMTGDGVNDAPALKKAEIGIAM-----
-----gsgtav-----

-----AKSAAEMVLSd-DNFSTIVsaVEEGRAIYNNMKQFI-----P


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yli-ssn-v-gevvcifltailgl-----p-ealipvqlllw
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f-frylaigvy--vglatvgaatxxxxxxx-----
-egpqv-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxxx-
sr----ypttma lsvltiemcn-alsnvse-nqsl l--xx--ppxlniwl lgaivms
malhffil--yvxxmpl-----ifqvtp l-----
-----swpqvw--vv--lkislpvilld-----
-----eglky l-----

```

d

-----xx
aya|stsevlk-----

-----nlg-----vdqnn|seeq-----

-----vtklrakhgknaiaeppt-----
-plwelileq-f-----
-----kdqlvlllgsa--avsfv
lalx-----xee--egwsafvd pav
ilti-l-----ilnavvgvsqe-----ss-----ae--ka
iaalqe-ys-----

-----ane-anv-----
-----l rn-----gh--vhr-----l
k-----
---aeeLVPGDII SVsv-----
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-----xxxx-----faVDQAILTGESESVGKda-

-----xxxxxxxxxxxx
xxq-----
-----i-----NMLFS--GTTV-----
vt--grak-----aVVVLTGSNTAIGdihesita-----

-----qiseptlkqklndfgdqlakvitvicvlvw
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IPEGLAVViTTCLALGTR-KMaakn-----

-----aVVR-SLPSVETLGSCSVICSDKTG-----
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-----xxxxexxx
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-----rm
aevtalc-----ndar-----
-----ixxxsxsgxx-----

-----snvgepte-galrvl-----xxxx-----
-----xxxxxxxxxxedrthya-sswyxx-----

-----qqueriatfefsrdk-smvsvxxxx-----

-----xxxxxxx-----
-v-----k-----
-----gap
e-----sildrcshalvgadxx-----

kvamnaklsall-mkevdy-gnr-----glrvIALAAldd-----
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IVITGDNRTAESICRKIGV-----fgexxd-----

-----xxx-----
-----ksftgrefd-----

-----qlspaqqle-----

aakka--sLFS--RVEPSHKSLVDLLq-----
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-----gsgtdv-----

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nlvtdglpatalsfnppd-hd-----imrrqpr--k-rdepliggl
f-frylvigty--vgaatvagyxxxxxxx-----
-egpqi-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxx
ak---sastvslsilvviemfn-avna|ss--sesll--xx--plxenmm|vyaials
malhfall--ytxxlqs-----lfsilpl-----
-----ntlewk---av--vyisapvivid-----
-----eflkli-----

-----errff-----

-----xxxxxxxx-----

-----xxxxx

q

>tpall_IIA101 XP_765090.1

m-----

XXXXXXXXXX

phvyeshevln

hys vnl dy lndeq

vllhrevlgshsf l kpkkl

sl l h l f i q q f

ddl l v k i l l s a a i v s f f

ftcx xxx x k khissfiepi v

ilfi l ilnalvgvwqe an ae ka

ldalkk lq

ptl anc

l r n g v x x t f

d

tenLVVGDIVKVkn

GDKIPADLRLVki

xxxxx-----IIVEQSQLTGESLLIYKtt-----
-----xxxxxxxxxxxxxx
xxk-----
-----r-----NILFG-STTV-----
cs---gtgi-----gVVVAVGMNTEIGtiqsaviexx-----
-----tentatplqkmlhdfgnslskvisici||vw
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xxxxxtmggfgdxxxxxxxxxxxxxxxxxxxxx-----tf
lkcaslc-----sdvt-----xxxxxxx
-----xxxxxtxxxgx-l-----

-----vlegepte-vaiiemxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-dsssi-kkmkxx-----xxx-xxxxxxxxxx
xx
xxxxxxxxxxxylieatlefortrk-mmsvxxxxxxxxxxxxxx-----

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e-----simevctsymlpdgx-----

vnklakseinei-l dhvkql-ane---alrvLAFSYRqa-xxxxxxxxxxxxxxxxxx
xx---xxxxxxxxsvktsnvfsr-iekdmfLGLVGIMDPPRPEVKDSISKCMRag-IRV
IMITGDNKLTAEAIARKVGI-----ikpxxr-----

-----xxx-----
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---el-ge-----IVAMTGDGVNDAPALKMADIGVSM--
-----xvngtev-----

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nlvt dgppatalgfnppd-pl-----vmkrepr--h-rndklidrit
l-lrylvigly--vglatcgifixxxxxx-----xx
xegntlxxxxxxxxxxxxxxxx-x-----xxx-----xxx-xxxxxxxxxxxxxxxx-
kv---kastlslttlvlemfn-alnalse--dssll--xx--apxtnpylicaiffs
vlihciil--yvxxfss-----lfnvvpI-----
-----dfydwk---wv--liwsfpvviid-----
-----ecfkIc-----

-----kksyqx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----XX-----

-----XXXXXXXXXX-----

-----XXXXX

y

>mmuII_IIA101 NP_031530.2

m-----

-----XX

ahsksteec|s-----

-----yfg-----vsettg|tpdq-----

-----vkrh | ekygpn | paeegk-----

-----s|we|vveq-f-----

-----edllvrilllaa--cisfv
lawx-----xxge--etvtafvpefv
illi-l-----ianaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
----yra-----drxxvqr-----i
k-----
----ardIVPGDIVEVav-----
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-----x--x-t--tlrVDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
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aa--gkav-----gIVATTGVSTELGkirdqmaa-----

-----teqdktpIqqkldefgeqlskvislicvavw
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-----xxxxxxxx
xxxxxapegevlxxxxxx-xxxxxxx-----
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aticalc-----ndss-----
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ekvgeate—tal t t l—xxxx—
xxxxxxxxxxxxxveranac—nsv i xx—
lmkkeftlefsrdrk—smsvxxxxx—
xxxxxxxxxxxxx—
v—k—gap
e—gvidrcnyvrvgtt—
rvpltgpvkeki—msvikewxxgrd—t l r c L A L A T R d t—x—xxx—
xxxv l d d s a k f m e—y e m d l t f V G V G M L D P P R K E V T G S I Q L C R D a g—l R V
I M I T G D N K G T A I A I C R R I G I—f s e x x e—
xxx—
raytgrefd—
dlplaeqre—
acrra—cCFA—RVEPSHKSK I V E Y L q—
sy—de—I T A M T G D G V N D A P A L K K A E I G I A M—
gsgtav—
AKTASEMVLAd—DNFST I V a a V E E G R A I Y N N M K Q F I—P

yli-ssn-v-gevvci fltaagl-----p--ealipvql lwv
nlvtdglpatal gfnppd-ld-----imdrppr---s-pkeplisgw
f-frymaiggy--vgaatvgaaaxxxxxx-----
-dgphv-xxxxxxxxxxxxxxxx-----xxx-----xxxxxxxx-----
ap---epmtmal svltiemcn-alslse--nqsl l--xx---ppxvniwl lgsicls
mslhflil--yvxxlpm-----ifklral-----
-----dftqwl---mv--lkislpvigld-----
-----el lkfi-----

-----arnyl-----

-----x-----

g

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m-----

-----xx
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-----hfg-----vnestglsleq-----

-----vkkllkerwgsnelpaeegk-----
-tllelvieq-f-----
-----edllvrilllaa--cisle
lawx-----xxge--etitaefvepfv
illi-l-----vanaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
-----yrq-----drxxvqr-----i
k-----
----akdIVPGDIVElav-----
----GDKVPADIRLTsi-----

-----x--x-t--tlrVDQSILTGESVSVIKht--

-----xxxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
aa--gkam-----gVVVATGVNTEIGkirdemva-----

-----teqertplqqkldefgeqlskvisliciavw
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IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----rmfildkve-----

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aticalc-----ndsa-----
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-----xxxxxxxxxxxxieranac--nsvixx-----

-----lmkkeftlefsrdk-smvsvxxxx-----

-----xxxxxxxx-xxx-----
-v-----k-----
-----gap
e-----gvidrothirvgst-----

kvpmtpgvkqki-msvirewxxgsd-----tlrcLALATHdn--x-----xxx-----
-----xxxhledsanfik-yetnltfVGCVGMLDPPRIEVASSVKLCRQag-IRV
IMITGDNKGTAVAICRRIGI-----fgqxxd-----

-----xxx-----
-----kaftgrefd-----

-----elspsaqr-----

```

ac|na--rCFA--RVEPSHKSKIVEFLq-----
--sf--de-----ITAMTGDGVNDAPALKKSEIGIAM--
-----gsgtav-----

```

-arynyl-

e

 $m =$

ahllsaadvlr
rfs vtaegglsleq
vtdarerygpnelpteegk
slwelvveqf
edllvrilllaa lvsfv
lawx xxge etttafveplv
imli l vanai vgvwqe rn ae sa
iealke ye
pem gkv
irs drxxvqr i
r
ardIVPGDIVEVav
GDKVPADLRL lei

-----x--x-t--tlrVDQSILTGESVSVTKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
as---gkal-----gVAVATGLQTELGkirsqmaa-----

-----veper t p l q r k l d e f g r q l s h a i s v i c v a v w
-v i n i g h f a x x x x x x x x x-----g a v y y f k i a V A L A V A A
I P E G L P A V i T T C L A L G T R - R M a r k n-----

-----a I V R - S L P S V E T L G C T S V I C S D K T G-----
-----T L T T N Q M S V c-----r m f v v a e a e-----

-----xxxxxxxxexxx
xxxxxtpegevrxxxxxx--xxxxxxx-----
-----e l
a t i c a l c-----n d s a-----
-----l x x x e x k g x x-----

-----e k v g e a t e - t a l t c l-----x x x x-----
-----x x x x x x x x x x x x v e r a g a c - n s v i x x-----

-----l m r k e f t l e f s r d r k - s m s v x x x x x-----

-----x x x x x x x x x x x x-----
-v-----k-----
-----gap
e-----s v i e r c s s v r v g s r-----

taplsttsrehi-lakirdwxxgsd---tlrcLALATRdt-x-----xxx---
-----xxxhlddcsrfvq-yetdltfVGCVGMLDPPRPEVAACITRCSRag-IRV
VMITGDNKGTAVAICRRLGI-----fgdxxd-----

-----xxx-----
-----kaytgrefd-----

-----dl speqqrq-----

acrtar-cFA-RVEPAHKSRIVENLq-----
---sf---ne-----ITAMTGDGVNDAPALKKAEIGIAM---
-----gsgtav-----

-----AKSAAEMVLSd-DNFASIVaaVEEGRAIYNNMKQFI-----R
yli-ssn-v-gevvcifltailgl-----p-ealipvqllwv
nlvtgdglpatalgfnppdld-----imekppr---n-prealisgwI
f-frylaigvy--vglatvaaatxxxxxxx-----
-egpqv-xxxxxxxxxxxxxxxxxxx---xxx-----xxxxxxxxx---
sr---fpttmalsvlvtiemcn-alsvse--nqslI--xx---ppxlnpwlI gavvms
malhfliI--lvxxlpl-----ifqvtpI-----
-----sgrqwg---vv--lqmslpvilld-----
-----ealkyl-----

-----srnhm-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXX--X-----

d

>rnoII_IIA101 NP_478120.1

m-----

-----XX

ahsksteecIs-----

-----yfg-----vsettgltpdq-----

-----vkrhlekygpnelpaeegk-----

-slwelvveq-f-----

-----edllvrilllaa--cisfv
lawx-----xxge--etvtafvpefv
illi-l-----ianaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
----yra-----drxxvqr-----i
k-----
----ardIVPGDIVEVav-----
----GDKVPADIRILsi-----

-----x--x-t--tlrVDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
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aa--gkav-----gIVATTGVSTELGkirdqmaa-----

-----teqdktpIqqkldefgeqlskvislicvavw
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IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----kmfiidkvd-----

-----xxxxxxxx
xxxxxapegevlxxxxxx-xxxxxxx-----
-----el
aticalc-----ndss-----
-----lxxxexkgxx-----

ekvgeate—talttl—xxxx—
xxxxxxxxxxxxxveranac—nsvixx—
lmkkeftlefsrdrk—smsvxxxxx—
xxxxxxxxxxxxx—
v—k—gap
e—gvidrcnyrvrgtt—
rvpltgpvkeki—msvikewxxgrd—tlrcLALATRdt—x—xxx—
xxxvlddsakfme—yemdltfVGVVGMLDPPRKEVTGSIQLCRDag—IRV
IMITGDNKGTAIAICRRIGI—fsexxe—
xxx—
raytgrefd—
dlplaeqre—
acrra—cCFA—RVEPSHKSKIVEYLq—
sy—de—ITAMTGDGVNDAPALKKAEIGIAM—
gsgtav—
AKTASEMVLAd—DNFSTIVaaVEEGRAIYNNMKQFI—P

-----xx
ahtktveevlg-----

-----hfg-----vnestglsleq-----

-----vkkllkerwgsn-----

-----v
lawx-----xxge--et itafvepfv
illi-l-----vanaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
-----yrq-----drxxvqr-----i
k-----
-----akdIVPGDIVElav-----
-----GDKVPADIRLTsi-----

-----x--x-t--tlrVDQSILTGESVSVIKht--

-----xxxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
aa--gkam-----gVVVATGVNTEIGkirdemva-----

-----teqertplqqkldefgeqlskvisliciavw
-iinighfnxxxxxxxxx-----gaiyyfkiaVALAVAA
IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----rmfildkve-----

-----xxxxxxxxxxxx
xxxxxapigevqxxxxxxxx-xxxxxxx-----
-----el
aticalc-----ndsa-----
-----lxxxexkgxx-----

-----ekvgeate--tal|tcl|----xxxx-----
-----xxxxxxxxxxxxieranac--nsvixx-----

-----lmkkeftlefsrdk-smvsvxxxx-----

-----xxxxxxxx-xxx-----
-v-----k-----
-----gap
e-----gvidrothirvgst-----

kvpmtpgvkqki-msvirewxxgsd----tlrcLALATHdn--x-----xxx-----
-----xxxhledsanfik-yetnltfVGCVGMLDPPRIEVASSVKLCRQag-IRV
IMITGDNKGTAVAICRRIGI-----fgqxxd-----

-----xxx-----
-----kaftgrefd-----

-----elspsaqr-----

acIna--rCFA--RVEPSHKSKIVEFLq-----
--sf--de-----ITAMTGDGVNDAPALKKSEIGIAM--
-----gsgtav-----

-----AKTASEMVLAd-DNFSTIVaaVEEGRAIYNNMKQFI-----R
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nlvtgdIpatalgfnppd-l d-----imnkppr--n-pkeplisgwI
f-frylaigcy--vgaatvgaaaxxxxxx-----
-ggprv-xxxxxxxxxxxxxxxxx-----xxx-----xxxxxxx--
sp---ypmtmalsvltiemcn-alslse--nqslI--xx--ppxenIwlvgsicls
mslhflil--yvxxlpl-----ifqitpl-----
-----nltqwl--mv--lkislpvilm-----
-----etlkfv-----

-----arnyl-----

-----xxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxxxx-----

-----xxxxx

s

>rnoII_IIA103 NP_037046.1

m-----

ahllsaadvlr
rfs vtaeggltleq
vtdarerygpnelpteegk
slwlvveqf
edllvrilllaa lvsfv
lawx xxge etttafveplv
imli l vanai vgvwqe rn ae sa
iealke ye
pem gkv
irs drxxvqr i
r
ardIVPGDIVEVav
GDKVPADLRL lei

-----x--x-t--tlrVDQSILTGESVSVTKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
as---gkal-----gVAVATGLHTELGkirsqmaa-----

-----veper t p l q r k l d e f g r q l s h a i s v i c v a v w
-v i n i g h f a x x x x x x x x x-----g a v y y f k i a V A L A V A A
I P E G L P A V i T T C L A L G T R - R M a r k n-----

-----a l V R - S L P S V E T L G C T S V I C S D K T G-----
-----T L T T N Q M S V c-----r m f v v a e a e-----

-----xxxxxxxxexxx
xxxxxtpegevrxxxxxx-----xxxxxx-----
-----e l
a t i c a l c-----n d s a-----
-----l x x x e x k g x x-----

-----e k v g e a t e - t a l t c l-----x x x x-----
-----x x x x x x x x x x v e r a g a c - n s v i x x-----

-----l m r k e f t l e f s r d r k - s m s v x x x x x-----

-----x x x x x x x x x x x x-----
-v-----k-----
-----gap
e-----s v i e r c s s v r v g s r-----

tvpl satsrehi-lakirdwxxgsd---tlrcLALATRdt-x-----xxx---
-----xxxqlddcsqfvq-yetgltfVGCVGMLDPPRPEVAACITRCSRag-IRV
VMITGDNKGTAVAICRRLGI-----fgdxxd-----

-----xxx-----
-----kaytgrefd-----
-----dl speqqrq-----

acrta--rCFA--RVEPAHKSRIVENLq-----
--sf--ne-----ITAMTGDGVNDAPALKKAEIGIAM--
-----gsgtav-----

-----AKSAAEMVLSd-DNFASIVaaVEEGRAIYNNMKQFI-----R
yli-ssn-v-gevvCIFltailgl-----p--ealipvqllwv
nlvt dglpatalgfnppd-l d-----imeklpr--n-preal isgwI
f-frylaigvy--vglatvaaatxxxxxxx-----
-egpqv-xxxxxxxxxxxxxxxxxxx---xxx-----xxxxxxxxx---
sr---fpttmalsvlvtiemcn-alsvse--nqsl l--xx--ppxlnpwl lgavvms
malhfllil--lvxxlpl-----ifqvtpI-----
-----sgrqwg---vv--lqmslpvilld-----
-----ealkyl-----
-----srhhv-----

X XXXXX

>dmeII_IIA101 NP_476832.1

[illegible]

ghsktveqsIn-

ffgtdpergltdq

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-----siwq|v|eq-f-----

-----ddllvkiillaa--iisfv
lalx-----xxhe--etftafveplv
illi-l-----ianavvgvwqe-----rn-----ae--sa
iealke--ye-----

-----pem-gkv-----
----vrq-----dkxxiqk-----v
r-----
----akeIVPGDLVEVsv-----
----GDKIPADIRIThi-----

-----xxxx-----lrIDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
-----k-----NILFS--GTNV-----
aa--gkar-----gVVI GTGLSTAIGkirtemse-----

-----teeiktpqqkldefgeqlskvisvicvavw
-ainighfnxxxxxxxx-----gaiyyfkiavalavAA
IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVs-----rmfifdkve-----

-----xxxxxxxx
xxxxxepigevfxxxxxxxx-----
-----el
sticimc-----ndsa-----
-----ixxxexkqxx-----

ekvgeate—talivl—xxxx—
xxxxxxxxxxxxrsaaiaac—rgeixx—
kwkkeftlefsrdrk—smssxxxxx—
xxxxxxxxxxxxx—
v—k—gap
e—gvlerctharv—gtx—
kvpltsalkaki—laltgqyxxgrd—tlrcLALAVAds—x—xxx—
xxxdlgdstkfyq—yevnltfVGVGMLDPPRKEVFDSIVRCRAag—IRV
IVITGDNKATAEAICRRIGV—faexxd—
xxx—
ksysgrefd—
dlspiteqka—
avars—rLFS—RVEPQHKSKEVEFLq—
sm—ne—ISAMTGDGVNDAPALKKAEIGIAM—
gsgtav—
AKSAAEMVLAd—DNFSSIVsaVEEGRAIYNNMKQFI—P

-----xx
ahakdanevck-----

-----ffg-----tgpe-gltpqq-----

-----vetlrnkygenempaeegk-----
-slwelileq-f-----
-----ddllvkilllaa--iisfv
lalx-----xxhexxeavtafvpefv
illi-l-----ianatvgvwqe-----rn-----ae--sa
iealke--ye-----

-----pem-akv-----
-----irs-----ghxxiqm-----v
r-----
----akeLVPGDLVEVsv-----
----GDKIPADLRLVki-----

-----xxxx-----irIDQSILTGESVSVIKht-----

-----xxxxxxxxx
xxk-----
-----k-----NCLFS--GTNV-----
as--gkar-----glVFGTGLTTEIGkirtetae-----

-----tenektplqqkldefgeqlskvisvicvavw
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IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVs-----kmfiagqas-----

-----xxxxxxxxexxx
xxxxxepvgkvsxxxxxxxxxxxxxxxxxxxxx-----
-----el
amcamc-----ndss-----
-----vxxxexkxxx-----

-----ekvgeate--talivl----xxxx-----
-----xxxxxxxxxxxkelggvc--nrviix-----

-----kwkkeftlefsrdk-smsaxxxx-----

-----xxxxxxxx-----
-v-----k-----
-----gap
e-----gvlgrothrvngq-----

kvpltsamtqki-vdqcvqyxxgrd---tlrcLALGTldt-x-----xxx-----
-----xxxnledstqfvk-yeqditfVGVGMLDPPRTEVSDSIKACNHag-IRV
IMITGDNKNTAEAIGRRIGL-----fgexxd-----

-----xxx-----
-----kaytgrefd-----

-----dlppeqqse-----

acrra--kLFA--RVEPSHKSKIVDILq-----
--sq--ge-----ITAMTGDGVNDAPALKKAEIGISM--
-----gsgtav-----

-----AKSASEMVLAd--DNFASIVsaVEEGRAIYNNMKQFI-----R
yli--ssn-v-gevvsi fmvaalgi-----p--ealipvqllwv
nlvtgdglpatalgfnppd--ld-----imdrhpr--s-andglisgwI
f--frylavgty--vgvatvgasmxxxxxxx-----
-egpqi-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxxxx--
dn----hpnamalsvltiemln-ainslse--nqslI--xx--ppxkniwlmaaisls
mslhfvil--yvxxmat-----ifqitpl-----
-----nwvewi--av--lkislpvllld-----
-----eilkfi-----

-----arnyi-----

-----xxxxx-----

-----xxxxx-----

d
>hsaII_IIA101 NP_775293.1

m-----

ahaktteec la
yfg vsettg ltpdq
vkrnlekyg lne lpaee gk
tlw elvieq f
edllvrilllaa cisfv
lawx xxge etitafvepfv
illi l ianaivgvwqe rn ae na
iealke ye
pem gkv
yra drxxvqr i
k
ardIVPGDIVEVav
GDKVPADIRILai

-----x--x-t--tlrVDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
aa---gkal-----gIVATTGVGTEIGkirdqmaa-----

-----teqdktpIqqkIdefgeqlskvislicvavw
-linighfnxxxxxxxx-----gaiyyfkiaVALAVAA
IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----kmfiidkvd-----

-----xxxxxxxxexxx
xxxxxapegevlxxxxxx-xxxxxxx-----
-----el
aticalc---ndss-----
-----lxxxexkgxx-----

-----ekvgeate--talttl---xxxx-----
-----xxxxxxxxxxxxveranac--nsvixx-----

-----lmkkeftlefsrdk-smvsvxxxx-----

-----xxxxxxxxxxxx
-v-----k-----
-----gap
e-----gvidrcnyrvrgtt-----

rvpltgpvkeki-mavikewxxgrd---tlrcLALATRdt--x-----xxx---
-----xxxvlddsarfle-yetdltfVGVGMLDPPRKEVTGSIQLCRDag-IRV
IMITGDNKGTAIAICRRIGI-----fgexxe-----

-----xxx-----
-----raytgrefd-----

-----dlplaeqre-----

acrra--cCFA--RVEPSHKSKIVEYLq-----
--sy--de-----ITAMTGDGVNDAPALKKAEIGIAM--
-----gsgtav-----

-----AKTASEMVLAd-DNFSTIVaaVEEGRAIYNNMKQFI-----R
yli-ssn-v-gevvcifltaalgl-----p--ealipvqllwv
nlvtgdglpatalgfnppd-l-d-----imdrppr--s-pkeplisgwI
f-frymaiggy--vgaatvgaaaxxxxxxx-----
-dgphv-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxxxx---
ap---epmtmalsvlvtiemcn-alslse--nqsl--xx--ppxvniwlgsicls
mslhflil--yvxxlpm-----ifklral-----
-----dltqwl---mv--lkislpvigld-----
-----eilkfv-----

-----arnyl-----

XXXXXXXX

>hsa||_||A102 NP_733765.1

[illegible]

-----XX

ahktveevlg-----

-----hfg-----vnestg|s|eq-----

-----vkk|kerwgsne|paeegk-----

-tllelvieq-f-----

-----edllvrilllaa--cisfv
lawx-----xxge--etita fvepfv
illi-l-----vanaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
----yrq-----drxxvqr-----i
k-----
----akdIVPGDIVElav-----
----GDKVPADIRLTsi-----

-----x--x-t--tlrVDQSILTGESVSVIKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
aa--gkam-----gVVVATGVNTEIGkirdemva-----

-----teqertplqqkldefgeqlskvisliciavw
-iinighfnxxxxxxxxx-----gaiyyfkiaVALAVAA
IPEGLPAViTTCLALGTR-RMakkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----rmfildrve-----

-----xxxxxxxx
xxxxxapigevhxxxxxxxx-xxxxxxx-----
-----el
aticalc-----ndsa-----
-----lxxxexkgxx-----

ekvgeate—tal tcl—xxxx—
xxxxxxxxxxxxxieranac—nsvixx—
lmkkeftlefsrdk—smsvxxxxx—
xxxxxxxxx—xxx—
v—k—gap
e—gvidrcthirvgst—
kvpmtsgvkqki—msvirewxxgsd—tlrcLALATHdn—x—xxx—
xxxhledsanfik—yetnl t fVGCVGMLDPPRIEVASSVKLCRQag—IRV
IMITGDNKGTAVAICRRIGI—fgqxxd—
xxx—
kaftgrefd—
elnpsaqr d—
aclna—rCFA—RVEPSHKSKIVEFLq—
sf—de—ITAMTGDGVNDAPALKKAEIGIAM—
gsgtav—
AKTASEMVLAd—DNFSTIVaaVEEGRAIYNNMKQFI—

-----xx
ahllpaadvlr-----

-----hfs-----vtaegglspace-----

-----vtgarerygpnelipseegk-----
-slwelvleq-f-----
-----edllvrilllaa--lvsfv
lawx-----xxge--etttafveplv
imli-l-----vanaivgvwqe-----rn-----ae--sa
iealke--ye-----

-----pem-gkv-----
-----irs-----drxxvqr-----i
r-----
----ardIVPGDIVEVav-----
----GDKVPADLRLlei-----

-----x--x-t--tlrVDQSILTGESVSVTKht-

-----xxxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
ts--gkav-----gVAVATGLHTELGkirsqmaa-----

-----veperptlqrkldefgrqlshaisvicvavw
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IPEGLPAViTTCLALGTR-RMarkn-----

-----aIVR-SLPSVETLGCTSVICSDKTG-----
-----TLTTNQMSVc-----rmfvvaead-----

-----xxxxxxxxxxxx
xxxxxtpegevrxxxxxxx-----xxxxxxx-----
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aticalc-----ndsa-----
-----lxxxexkgxx-----

-----ekvgeate--tal|tcl|-----xxxx-----
-----xxxxxxxxxxxxxveragac--ntvixx-----

-----lmrkeftlefsrdk-smvsvxxxx-----

-----xxxxxxxxxxxxx-----
-v-----k-----
-----gap
e-----sviercssvrvgsr-----

tapltptsreqi-lakirdwxxgsd-----tlrcLALATRda--x-----xxx-----
-----xxxelddcskfvq-yetdltfVGCVGMLDPPRPEVAACITRCYQag-IRV
VMI TGDNKGTAVALCRRLGI-----fgdxxd-----

-----xxx-----
-----kaytgrefd-----

-----dl speqqrq-----

XXXXXXXXXXXXXX
XXXXXXXXXXXXXX
XXXXXX-XX
X
awartpsec|a
elg vaadrglssee
aaarlrrypnelerhaap
-svwklvleq-f
ddtlvrillaaa-vvsfv
lalx-xxx-x xge-vgatafveplv
ifli-l ivnavvgvwqe sn ae ka
lealke-iq
seh-atv
krd grx-shg l
p
ardLVPGDIVELrv
GDKVPADMRVLql

-----x--x-s--tlrVEQGS LTGETASVNKts-

-----XXXXXXXXXX

xxk-----

-----qeedtp|kkk|nefga|tai|gvica|vw

-----aLVR-KLPSVETLGCTTVICSDKTG-----

-----TLTTNQMSAv-----klvaigrwp-----

-----XXXXSXXX

xxxxxdpsdghixxxxxxxxxxxxx-----

aki aavc-----ndas-----

-----vatgmpte--aa|kv|-----xxxxxxxx

```
xxxxxxx-----ssd||rc--cqwxxx-----
```

-----XXXXXXXX-----

vvlldegakali-lstlrem-sas---alrcLGFAYKedxxxxxxxxx-----
-----xxxxxxkylldpsyysxiesnlifCGFVGLRDPPREEVHKAIEDCRAag-IRV
MVITGDNKETAEAlCREIGV-----fgsxxd-----

-----xxx-----
-----ksftgkefm-----
-----sl---sdkkk-----

llrqtxxILFS---RAEPKHKQElVRLLk-----
---ed---ge-----VVAMTGDGVNDAPALKLADIGVAM---
-----xitgtev-----

-----AKEASDMVLAd-DNFSTIVaaVGEGRS|YDNMKAFI-----R
ymi-ssn-i-gevasifltsalgi-----p---eglipvqllwv
nlvtdgppatalgfnpp-----

>pfaII_IIA101 XP_001350994.1

m—

-XXXXXX

ahtydvedv lk-

-f | d-----vnkdng | knee-

-lddr r lkyg lne lvekkk-

-sifeli lnq-f-

-----ddl|vk|ll|aa--fisfv
ltlx-----xxx-----xkk--ieicdfieplv
ivli-l-----ilnaavgvwqe-----cn-----ae--ks
lealke--lq-----

-----ptk-akv-----
-----lrd-----gkxxi-----i
d-----
----skyLYVGDIIELsv-----
----GNKTPADARI lki-----

-----xxxx-----lkVEQSMLTGESCSVDKyA-

-----xxxxxxx-----

-----xxxxxx
xxk-----
-----NILFS--STAI-----
vc--grci-----aVVINIGMKTElGhiqhaviexx-----

-----sedtqtplqikidlfqq|skii fvicvtvw
-i infkhfsxxxxxx-xxx-----gclyyfkisVALAVAA
IPEGLPAViTTCLALGTR-RMvkkn-----

-----a lVR-KLQSVETLGCTTVlCSDKTG-----
-----TLTTNQMTTt-----vfhl fresd-----

-----xxxxxxx|cxxx
xxxxxyessn|txxx
xxnf
ymc|vnc-----nean-----
-----ixxxdxsqxx-----


```

yli-ssn-i-gevasifitalgi-----p-dslapvqllw
nlvtdglpatalgfnppe-hd-----vmckpr--h-kndnlnglt
l-lryiigt-ygiatvsifvxxxxxx-----x
xmhltxxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxx-
ki---kastlsisvlvliemfn-alnalse--ynslf--xx--ppxrnmylvlatigs
lllhvlii--yixxlar-----ifgvvpl-----
-----saydwf----lv--flwsfpviild-----
-----eikfy-----

```

d

XXXX-----XXXXXX-

-----x
awakdvaecee-----

-----hfv-----vsrekglsde-----

-----vlkrhqi yglnelekpegt-----
-sifklileq-f-----
-----ndtlvrillaaa--visfv
lafx-----xxx-x-----xge--mgitafveplv
ifli-l-----ivnaivgiwqe-----tn-----ae--ka
lealke--iq-----

-----sqq-atv-----
-----mrd-----gtx-vss-----l
p-----
-----akeLVPGDIVELrv-----
-----GDKVPADMRVVal-----

-----x--x-s--tlrVEQGS LTGESEAVSKtt-----

-----xxxxxxxxx
xxk-----
-----k-----CMVFA--GTTV-----
vn--gnci-----cLVTD TGMNTElGrvhsqi qexx-----

-----qheedtp lkkklnefgevl tmi iglicalvw
-l invkyflxxxxxxxx-xxxxxxx-----xx-----kctyyfeiaVALAVAA
IPEGLPAViTTCLALGTR-KMaqkn-----

aLVR-KLPSEVETLGCTTVICSDKTG
TLTTNQMAVs klvamgsri
xxxxxx
xxxxxdprdgkixxxxxxxxxxxxxx
mi
akiaaic ndan
vxxx dxqf
vsrgmpte aal kvl xxxxxxxx
xxxxxxx dgdv lrc cr lwxx
leqr iat lefd rdk smgvxxxxx
xxxxxxx
v k
gav
e nvlersthiqlldgx
kreldqysrdli-lqslrdm-sls-alrcLGFAYSdvxxxxxxxxx
xxxxxxxqqllnpsnyxiesnlifVG FVGLRDPPEPRKEVRQA IADCR Tag-IRV
MVI TGDNKSTAEAI CREIGV feaxxd
xxx
rsltgiefm
dv adqkn

hIrqtxxILFS--RAEPKHKQEI VRLlk-----
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-----xisgtev-----

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nlvtgdgppatalgfnppd-kd-----imkkppr--r-sddslitawi
l-frymvigly--vgvatvgvfixxxxxx-----xxxxxx
xdghslxxxxxxxxxxxxxx-x-----xxxxxxxxxxxxxx-xxxxxxxxxxxxxx-
ki---kastlsisvlvaiemfn-slnalse--dgslv--xx--ppxvnpwlllamavs
fglhfvil--yvxxlaq-----vfgivpl-----
-----slnewl---lv--lavslpvilid-----
-----evlkfv-----

-----grctsx-----x-----

-----x-----

-----xxxxxxxxx-----

-----x-----

e

>athII_IIA102 NP_191999.1

m-----

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aws-sveqcl-k-----
-----eyk-----trldkgltsed-----
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-----ddtlvkil lgaa--fisfv
lafx-----xxehxxxsgfeafvepfv
ivli-l-----ilnavvgvwqe-----sn-----ae--ka
lealke-mq-----
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-----lrd-----gnx-lpn-----l
p-----
areLVPGDIVELnv-----
GDKVPADMVRSgl-----

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—e—-----NMVFA—GTTV—

vn---gscv-----c|VTSIGMDTEIGkiqrqihexx-

-lee set p l k k k l d e f g s r l t t a i c i v c v l v w

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IPEGLPAV i TTCLALGTR-KMaqkn-

—a I VR—KLPSVETLGCTTV I CSDKTG—

-**TLTTNQMSAt**-----**efftlggkt**

-XXXXVXXX

xxxxdpkdggi xxxxxxxxxxxxxx-

$$-av$$

aeicsic-----ndag-

-vxxxgxlf-

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-ratg|pte--aa|kv|----xxxxxxxx
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xxxxxxxxxxxxxxxxssvk|ac--cdwwxx

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$$-V \text{-----} k$$

--gaa

e-----siler ssfaqladgx-

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-----xxx-----
-----ssftgkefm-----
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ilsksxkVFS--RAEPRHKQEI VRMLk-----
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-----xitgtev-----

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nlvtgdgpatalgfnpad-id-----imkkppr--k-sddclidswv
l-irylvigsy--vgvatvgifvxxxxxxx-----xxxxxxx
xdghtlxxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxx-
kv---kpmtlsltvlvaiemfn-slnalse--dnsl--xx--ppxrnpllvamtvs
falhcvil--yvxxlan-----vfgivpl-----
-----sfrewf--vv--ilvsfpvilid-----
-----ealkfi-----
-----grcrr-----

XXXX

XXXXX

m

[illegible]

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-----pfwk|v|kq-f-----

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illi-l-----aanaavgvite-----tn-----ae--ka
leelra--yq-----

-----ani-atv-----
-----lrn-----gcxxi-----l
p-----
-----ateLVPGDIVEVtv-----
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amcsslc-----ndsi-----
-----lxxpxkdxx-----

ek igeste--valrvl---xxxx--
xxxxxxxxxxxxxxxxxherasyc--nhywxx--

-----qfkkvylvleftdrk-mmsvxxxxx-

-----xxxxxx
-s-----k-----gap
e-----si iarcnkilcngdxx-----

vvpltaagrael-esrfysf-gde---tlrcLALAFKtv-----
-----phgqqti syxnendltf lGLVGMLDPPREEVRDAMLACMT ag-IRV
IVVTGDNKSTAESLCRKIGA-----fdnxxd-----

-----xxx-----
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-----r lpavqqtl-----

alrrm-tLFS-RVEPSHKRMLVEALq-----
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-----gsgtav-----

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srntg
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lawx-----xxge--etvtafvpefv
illi-l-----ianavvgvwqe-----rn-----ae--sa
iealke--ye-----

-----pem-gkv-----
-----yrs-----drxxvqr-----i
k-----
----are l VPGD IVEVsv-----
----GDKVPADIRITai-----

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-----xxxxxxxxxxxxx-----
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-----xxx-----
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-----dlplpqre-----

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f-frylaiggy--vgaatvaaagxxxxxxx-----
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-----ealkfv-----

-----arnyl-----

-----x-----

a

>drell_IIA102 NP_001071001.1

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 yfs vsettg lspeq
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 siwel iieq f
 edllvrilllaa cisfv
 lawx xxge etitafvepfv
 illi l ianavvgvwqe rn ae sa
 iealke ye
 pem gkv
 yrs drxxvqm i
 k
 arelVPGDIVEVsv
 GDKVPADIRIThi

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xxk-----
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aticalc-----ndss-----
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-egpqv-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxxxx---
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mslhfmii--yvxxmpm-----ifrlthl-----
-----nteqwf--vv--lklsfpvilid-----
-----emlkfl-----

-----arnyv-----

x

m

nfs vnestgltldq

-----vkrnr dkwgpnelpaeegk-----

-----siwelvieq-f-----

-----edllvrilllaa--cisfv
lawx-----xxge--etita fvepfv
illi-l-----ianaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
----yrq-----drxxvqr-----i
k-----
----akdIVPGDIVEVav-----
----GDKVPADIRISai-----

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aticalc-----ndss-----
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lmkkeftlefsrdrk—smsvxxxxx—
xxxxxxx—xxx—
v—k—gap
e—gvidrcayvrvggs—
kvpltgikdki—msvireyxxgrd—tlrcLALATRdn—x—xxx—
xxxvlsdtarfad—yesdltfVGCVGMLDPPRTEVAASIKLCRHag—IRV
IMITGDNKGTAVAICRRIGI—fsdxxd—
xxx—
maftgrefd—
dlsphaqre—
avtva—rCFA—RVEPSHKSKIVEFLq—
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gsgtav—
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mslhflil--yvxxlpv-----ifqitpl-----
-----nvtqwm--mv--lkislpvilld-----
-----ellkfv-----

d

>drell_IIA104 NP_001025448.1

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ahtktveevys-----

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lawx-----xxge--etitaфvepfv
illi-l-----ianaivgvwqe-----rn-----ae--na
iealke--ye-----

-----pem-gkv-----
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k-----
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-----dl saaagre-----

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 ---sy-de-----ITAMTGDGVNDAPALKKAEIGIAM--
 -----gsgtav-----

-aryl-

-XXXXXXXXXXXX-

S

m-

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 illi-l ianaivgvwqe rn ae na
 iealkq ye
 pem gkv
 yrq drxxvqr v
 r
 ardIVPGDIVEVav
 GDKVPADIRLTsi

-----x--x-t--tlrVDQSILTGESVSVLKht-

-----xxxxxxxx
xxk-----
-----k-----NMLFS--GTNI-----
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-----tdper t p l q q k l d q f g e q l s m v i t v i c v a v w
-g i n i g h f n x x x x x x x x x-----g a v y y f k i a V A L A V A A
I P E G L P A V i T T C L A L G T R - R M a r k n-----

-----a I V R - S L P S V E T L G C T S V I C S D K T G-----
-----T L T T N Q M S V s-----r l f i v d m v a-----

-----xxxxxxxxexxx
xxxxxa p e g e v s x x x x x x x-----xxxxxxx-----
-----em
a s i c a l c-----n d s s-----
-----l x x x e x k g x x-----

-----e k v g e a t e - t a l c c l-----xxxx-----
-----x x x x x x x x x x a e r a t a c - c s v i x x-----

-----l m r k e l t l e f s r d r k - s m s v x x x x x-----

-----xxxxxxxxxxxxx-----
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-----gap
e-----s v l e r c r w i r v s g g x-----

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-----arnyi-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXX-----

-----XXXXX

d

>drell_IIA106 XP_697108.2

m-----

-----XX

ahtksasev|a-----

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iealke--ye-----

-----pem-gkv-----
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k-----
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----GDKVPADIRITsi-----

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raytgrefd
dlapeagre
avkra--rCFA--RVEPAHKSKIYAYLq
sf--de--ITAMTGDGVNDAPALKKAEIGIAM
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f

>cneII_IIA101 XP_572412.1

m-----

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awtftpqdal g-----

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laix-----xxxxx-----xgg--swmtafveplv
illi-l-----vanaavgvique-----tn-----ae--ka
idalke-ys-----

-----pde-alv-----
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s-----
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 iaalqeys
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 GDRVPADCRLLa i

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nlvtgd|pata|sfnpad-hd-----vmrrppr--k-rdeplvggw|
l-frylvigty--vgaatvfgyvxxxxxxx-----
-egpqi-xxxxxxxxxxxxxxxxxxx-----xxx-----xxxxxxx
sr---sastvslsilvviemln-amnalss--sesll--xx--glxnnmmlvyaiils
mtlhfail--yixxlqg-----lfailpl-----
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mrqx-----ddavs
itva-i-----iivvtvafvqe-----yr-----se--ks
leelgk--lv-----

-----ppe-chc-----
----ire-----gh--leh-----l
l-----
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vevgcvc-----ndam-----
-----ixxx-----

-----t l m g r p t e--g a l i a l-----x x x x x-----
-----l e g l x x-----

-----e f v r l e e i p f t s e q k--w m a v x x x x x-----

-----x x x x x x x x x x-----
-v-----k-----
-----g a y-----
e-----q v i r f c t s y n s k g v-----

t m p l n n q q r d f y--q q q k s y m--g s g-----g l r v L A F A S G s e-----
-----m g s l t f L G L V G I D P P R A G V K E A V A T L I S s g--V A V-----
K M V T G D S E E T A V A I A S R L G L-----y t k-----

-----x x q c l s g d e v d-----

-----q m d i q h l s q-----

i v h r v--v V F Y--R A S P R H K L K I V K S L q-----
--n i--g a-----V V A M T G D G V N D A V A L K A A D I G V A M-----
-----x q t g t d v-----

-----C K E A A D M I L V d--D D F Q T I L s a I E E G K G I Y N N I K N F V-----R-----

erlrc

xxxxxxx

xxxxxx

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[illegible]

[illegible]

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xxxxxgprpdsxxxxxxxxx-----
-----kv
alvgnlcxxxxxneqg-----

-----invgqate--valInv-----
-----lpvlkae--dqrk-----

-----nfirkseipfssetk-tmsi-----

-----xxxxxx-----xxxxxx-----
-l-----k-----
-----gav
e-----qviarcryyyvtdsx-----

tpsldtatqkii-ldramev--skr----glrvIAMAYGfp-----
-----gkgdxeppnlvfVGFEAMMDPPRNGVVHAVSALHSag-VQI
VMI TGD AEPTAVAIAKQLGL-----kvsxxtxx-----

-----xxxxxx-----
-----xxxxxxscilgsqid-----

-----qnterelve-----

rvssi--tVYA--RTTPRHKMAIVKAWq-----
--mr--ga-----VVAMTGDGVNDSPALKMADIGISM--
-----xksgrtdv-----

-----AKEAADVILVd-DDFASILpaVEEGKSIFYNIQNFL-----S
fql-sta-v-aalslitlsvfkl-----a--nplnamqilfi
nilmdgppaqaalgvdvdpd-ee-----imrqppr--k-kgshvlstrl
i-yrvlfsaam--ivlgtlwiytxxx-xx-----
-gsm-----
sr----rdqtmftvfvfldlvs-alqnrgrl--ttpmf-----rnrmlfltisvs
ficqlali--yixxlqh-----vfqteal-----
-----sardlf--ml--lglagtsmgllh-----
-----egrrww-----

-----erkqv-----

-----x-----

-----XXXXXXXX-----

-----xx-----

v

>anill_IIA201 EAA62044.1

m-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----XXXXXXXXXX
ysqlspqetad-----
-----rlq-----tslthgltpae-----
-----aeiryirdgpnelpheepe-----
-plwlrflkq-f-----ketllllllasa-avsf
mgnx-----ddavs
itla-v-----tivvtvgfvqe-----yr-----se-----ks
lealnr--lv-----
-----phh-ahl-----
-----ird-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXgs-----vsXXXXXXXXX
p-----
---aaeLVPGDLVLFtv-----
---GDRIPADIRITaa-----

tdlTDESNL TGENEPVVKyp
 xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
 xxxxxx
 xxq
 h NIAFM GTLV
 rs gygq gIVIGTGAKTEFGsisaslqe
 iesprtpqlsmdrlgqelsyisfgvialiv
 vvqliqgr klldmftigVSLAVAA
 IPEGLPI IvTVTLALGVL RMasrg
 aIMR RLPSVETLGSVNVVCSDKTG
 TLTLNHMTVt kmwhfdcae
 xxxxxhxxx
 xxxxxpaartv|xxxxxxxxxxxxxxxxxxxxxxxx
 ss
 aavlsstxxxxxgsmk
 xrwvgqptd vaildl
 ldafged dvr dx
 isarvaetpfsserk wmgvxxxxx
 xxxxxxxxxxxxxxxxxxxx
 i k
 gal
 e qvlarcdyltkdgx

A 10x10 grid with a path of 'X' marks. The path starts at (0,0), goes right to (9,0), then up to (9,9), then left to (0,9), and finally down to (0,0). The path is marked with 'X' characters at each step.

m

XXXXXXXXXXXXXXXXXX

ase|pvdevas

-----i|q-----an|qng|knce

-----vchrrafhgwnfd|sede

-plwkky|sq-f

-----knplimlllasa--visvl
mhqx-----ddavs
itva-i-----livvtvafvqe-----yr-----se--ks
leelsk--lv-----

-----ppe-chc-----
----vre-----gr--veh-----t
|-----
----ardLVPGDTVCLsv-----
----GDRVPADLRLFea-----

-----v--dlslDESSLTGETAPCAKst-

-----xxxxxxxxxxxxxx-----

-----NIAFM--GTLV-----
rc--gkak-----g l V I G T G E N S E F G e v f k m m q a-----

-----eeapktplqksmdl l g k q l s l y s f g i i g v i m
-lvgwlqgk-----hildmftigVSLAVAA
IPEGLPIVvTVTLALGVM-RMvkk-----

-----a l V K - K L P I V E T L G C C N V I C S D K T G-----
-----TLTKNEMTVt-----hiftdgqh-----

-----xxx
xxxxxnrfgdvmx--xxxxxxxxxxxxxx-----
-----ki
veagcvc-----ndal-----
-----ixxx-----

erske

XXXXXXXXXXXX

XXXXXX

>mgrll_IIA201 XP_365047.2

m

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXXXXXXXXXXXX
fsyltasetat-----

-----rlq-----tslthglate-----

-----alrrqqdhglnepheppe-----
-plwlrfiqg-f-----
-----keplillllasa--aasif
lgnx-----ddavs
itva-v-----tivotvgfvqe-----yr-----se--ks
iealsh--lv-----

-----pdh-ahl-----
-----irnxxaa--lea--xxxxv
m-----
-----aeqLVPGLVIFtt-----
-----GDRIPADIRVTka-----

-----xx-----ltIDASNLGENEPERLta-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXX
xyp-----
-----k-----NVAYM--GTLV-----
rs--ghgq-----glVFATGGNTHFGtislsvsg-----

-----tesprspqlsmdeiggqlskfsfivigfis
-ligflgk-----klleiftisISLAVAA
IPEGLPIlvTVTLALGVH-RMakrn-----

-----aIVR-KMPKVETLGSVNIVCTDKTG-----
-----TLTMNHMTTt-----kmwyfgqqs-----

-----xxxxxxdxxx
xxxxxaatlri|xxxxxxxxxxxxxxxxxxxxxx-----
-----ra
vlsstlgxxxxsayt-----

-----rwvgqptd--vaml|-----
-----ldrfkeh--dvrgx-----

-----vgprttetpfsserk-wmgvxxxxxxxxxx-----

-----xxxxxx-----
-i-----k-----
-----gal
d-----rvlascdtyitgeg-----

efvldsnrrqea-iqaaeqm--aak----glrvLAFASGav-----xxxxxxxxxx
xxxxxxxxxxxxxxxxsedghpatnexpytgltfAGLVGMSDPPRPGVARSIRKLMRgg-VKV
IMITGDAETTAVAIGRQLGM-----hiaxxi-----

-----xxxx-----
-----xxxxxpv|rgeevd-----

-----amteee|aq-----

```
amqtt--tVFA--RTNPDHKMKIIRALq-----
--mr--gd-----IVAMTGDGVNDAPALKKADIGIAM--
-----xrqgtdv-----
```

-k--yg-

-XXXXXXXXXX-

—X

V

m-

xxxxxxxxxxxxxxxx
 xxxxxxxxxx
 xxx
 aselavsevag
 llqadlqnglnkse
 vshrrafhgwnefdisede
 plwkkyisqf
 knplimlllasavisil
 mrqx
 ddavs
 itva-ivivvtvafvqeyrseks
 leelsk-lv
 ppe-chc
 vre
 gk-leh-t
 l
 ardLVPGDTVCLsv
 GDRVPADLRLFea

-----v--dlsVDESSLTGETAPCSKvt--

-----xxxxxx-xxxxxxxx-

-----NIAFM--GTLV-----
rc---gkak-----gIVIGTGENSEFGevfkmmqa-----

-----eeapktplqksmdl lgkqlsfysfgi igi im
-lvgwllgk-----dilemftisVSLAVAA
IPEGLPIVvTVTLALGVM-RMvkkv-----

-----aIVK-KLPIVETLGCCNVI CSDKTG-----
-----TLTKNEMTVt-----hiltsglh-----

-----xxx
xxxxxnqfgevix-xxxxxxxxxxxxxxxx-----
-----ri
veagcvc---ndav-----
-----ixxx-----

-----timgkpte--galial---xxxxx-----
-----ldglxx-----

-----dyirkaeypfsseqk-wmavxxxxx-----

-----xxxxxxxx-----
-m-----k-----
-----gay
e-----qvikycttynskgq-----

tlaltqqrdly-qqekarm-gsa---glrvLALASGpe-----
-----lgqltflGLVGIIDPPRTGVKEAVTTLIAsg-VSI
KMITGDSQETAIAIASRLGL-----ysk-----

-----xxqsvsgeevd-----

-----tmevqhlsq-----

ivpkv-aVFY-RASPRHKMKIIKSLq-----
--kn-ga-----VVAMTGDGVNDAVALKAADIGVAM--
-----xqtgtdv-----

-----CKEAADMILVd-DDFQTIMsaIEEGKGIYNNIKNFV-----R

fql-sts-i-aaltlislalmnf-----p--nplnamqilwi

niimdgpqaqlgvepvd-kd-----virkppr--n-wkdsiltknl

i-lkilvssii--ivcgtlfvfwxxx-xx-----

-nvi-----

tp---rdttmtftcfvfdmfn-alssrsq--tksvf--xx---glxsnkmfcyavlg

imgqllvi--yfxxlqk-----vfqtesl-----

-----sildll---fl--lgtssvcivs-----

-----eiikkv-----

-----ersre-----

-----rnpllllllgss--vsvl
tkex-----edavs
iala-v-----livvtvgfiqe-----yr-----se--ks
leeltk--lv-----

-----ppe-cnc-----
----lrd-----gk--lrh-----m
l-----
----ardLVPGDIVSLsm-----
----GDRIPADIRLTev-----

-----x-----dIIVDESSFTGEVEPCGKtd-

-----xxxxxxxx
xxl-----
-----s-----NVVFM--GTLV-----
qc--gkgq-----gVVIGTGEQSQFGevfkmmra-----

-----eetpktpqksmdklgkqltifsfgiigl m
-lvgwvqgk-----pfismftvgVSLAVAA
IPEGLPIVvMVTLVLGVL-RMakkr-----

-----vIVK-KLPIVETLGCCNVCSDKTG-----
-----TLTANEMTAt-----qlvtsdgfh-----

-----xxx
xxxxxsgegtvcxxxxxxxxxxxxxxxxxx-----
-----kl
veagcva-----nnav-----
-----ixxx-----

avmgqpte—ga|vv|—xxxxx—
lgsixx—
syvrkkeipfsseqk—wma vxxxxx—
xxxxxxxxx—
m—k—
gaf—
e—evihhcsmy nnggi—
p|p|tpqqksyc—qee kkm—gs|—glrvLALASGpe—
lgr|tflGLVG|IDPPRAGVKEAVQVLSeg—VSV
KMVTGDALETALAIGRTIGL—cne—
xxkamsgeeve—
gteqgalaa—
rvrqv—sVFF—RTSPKHVKV|IKALq—
es—ga—IVAMTGDGVNDSVALKSADIGIAM—
xqtgtdv—
SKEAANMILVd—DDFSAIMsaVEEGKGI FYN|KNFV—P

fql-sts-i-aalsliltstvcnl-----p-splnamqilwv
niimdgpqaqslgvepvd-rd-----alrrppr--s-vgdtilnral
i-lrvlmsaav--iiggtlfifwxxxxxx-----
-gts-----
tp---rtttmaftcfvffdlfn-alscrsq--tklif--xx--gfxnrnmflysvlg
llgqlavi--yaxxlqk-----vfqtenl
-----saldll----ll--tglassvfils
-----ellklw-----

V

m

-----kd|wes|ag-----

-----h|q-----ad|qng|nkse-----

-----vshrrafhgwnefdi sede-----

—plwkkyisq-f-----

-----knplimllasa--visvl

mrqx-----ddavs

itva-i-----livvtvafvqe-----yr-----se----ks

lee|sk--|v-----

-----ppe-chc-----

-----vre-----gk--leh-----t

-----ardLVPGDTVCLsv-----

-----GDRVADLRLFea-----

-----v--d|s|DESSLTGETTPCSKvt-----

-----XXXXXXXXXXXXXXXX-----

-----NIAFM-GTLV-----

rc---gkak-----gIVIGTGENSEFGevfkmmqa-----

-----eeapktplqksmdl|gkqlsfysfgiigiim

-|vgw|lgk-----dilemftisVSLAVAA

IPEGLPIVvTVTLALGVM-RMvkk-----

-----aIVK-KLPiVETLGCCNViCSDKTG-----
-----TLTKNEMTVt-----hiItsglH-----

-----xxx
xxxxxnqfgevix-xxxxxxxxxxxxx-----
-----ri
veagcvc-----ndav-----
-----ixx-----

-----tImgkpte-galial-----xxxxx-----
-----ldglxx-----

-----dyirkaeypfsseqk-wmavxxxxx-----

-----xxxxxxxxx-----
-m-----k-----
-----gay
e-----qvikycttynskgq-----

tIaltqqrdly-qdekaqm-gsa-gIrvLALASGpd-----
-----lgqItfLGLVGiIDPPRTGVKEAVTTliAsg-VSI
KMITGDSQETAIAIASRLGL-----ysk-----

-----xxqsvsgeevd-----

-----tmevqhIsq-----

i vpkv--aVFY--RASPRHKMK I I KSLq-----
--kn--gs-----VVAMTGDGVNDAVALKAAD I GVAM--
-----xqtgtdv-----

-ersre-

-XXXXXXXXXX-

V

m-

-----XXX-----

-----XXXXXXXXXX-----XXX

ackcskeel ar-----

-----tfh-----vdl dsgl sefa-----

-----vaqrrlvhgwnefvtdnte-----

-pvwkkyldq-f-----

-----rnpllllllgss-----vsvl

tkex-----eda is

iala-v-----livvtvgfiqe-----yr-----se-----ks

leel tk--lv-----

-----ppe-cnc-----

-----lrd-----gk-----lrh-----m

|-----

-----ardLVPGDVVSLsm-----

-----GDRIPADIRLTev-----

-----x-----dIIVDESSFTGEVEPCSKtd-

-----xxxxxxxx
xxl|-----
-----s-----NVVFM--GTLV-----
qc---gkgq-----gVVIGTGEQSQFGevfkmmra-----

-----eetpktopksmdklgkqltvfsfgiigllm
-lvgwvqgk-----pillsmftigVSLAVAA
IPEGLPIVvMVTLVVLGVL-RMakkr-----

-----vIVK-KLP|VETLGCCNV|CSDKTG-----
-----TLTANEMTat-----qlvtsdgfh-----

-----xxx
xxxxxsgegtvcxxxxxxxxxxxxxxxxxxxxx-----
-----kl
veagcva---nnav-----
-----vxxx-----

-----avmgqpte--galvvl---xxxxx---
-----lgsixx-----

-----syirkkeipfsseqk-wmavxxxxx-----

-----xxxxxxxx-----
-m-----k-----
-----gaf
e-----evihhcstynnggi-----

plpltpqqksyc-qqeekkm--gs|---g|rvLALASGpe-----
-----|gr|tfLGLVG|IDPPRAGVKEAVQALSEsd-VSV
KMVTGDALETALA|GRT|GL-----cde-----

-----xxkamsgeeve-----

-----gmeqda|aa-----

rvrqv--sVFF--RTSPKHVKI|KALq-----
--es--ga-----IVAMTGDGVNDSVALKSADIGIAM--
-----xqtgtdv-----

-----SKEAADMILVd-DDFSAIMsaVEEGKGI FYN|KNFV-----R
fq|sts-i-aalslitlstvcnl-----p--nplnamqilwv
niimdgpqaqslgvepvd-rd-----alkrppr--s-vkdtilnral
i-lkilmsaav--ilggtlifwxxxxxx-----
-rts-----
tp---rtttmaftcfvfdfn-alscrsq--tklif--xx--gfxrnmflysilgs
llgqlavi--yaxxlqk-----vfqtenl-----
-----saldll---ll--tglassvfils-----
-----ellklc-----

-----ekfcs-----

A 10x10 grid with a path of 'X' marks. The path starts at the bottom-right corner (row 10, column 10), moves left to (10, 1), then up to (1, 1), and finally right to (1, 10). The grid is defined by solid top and bottom lines and dashed horizontal lines. The path is marked with 'X' characters at each step.

m

XXXXXX

-----r|q-----vdvrtg|kwte-----

-----ptwkkyyieq-f-----

-----rnpllllllgsa--lvsvi
mkqx-----ddavs
itia-i-----livvtvafiqe-----yr-----se--ks
leelkk--lv-----

-----ppe-chc-----
----lre-----gr--ldt-----f
l-----
----areLVPGDIVHLnv-----
----GDRVPADVRLFea-----

-----v--dlslDESSFTGETEPARKit-

-----xxxxxxxxxxxx
xxm-----
-----k-----NIAFM--GTLV-----
rc--gngk-----gIVVSTGERSEFGevfkmmqa-----

-----eeapktplqksmdilgaqlsfysfliigvim
-llglqgk-----plsemfnisVSLAVAA
IPEGLPIVvTVTLALGVM-RMakrn-----

-----sIVK-KLPTVETLGCVNVICSDKTG-----
-----TLTKNEMTAt-----iiitsdgym-----

-----xxx
xxxxxndqgeihxxxxxxxxxxxxxxxxx-----
-----nl
leigavc--nnay-----
-----ixxx-----

er tme

XXXXXX

X

XXXXXX

```
>cellll_lla201 NP_001021862.1
```

-----XXXXXXXXXXXXXXXXXXXX

XX--

-----XXXXXXXX--xxx
aashevpcth-----

-----qlr-----tnleeglttae-----

-----atrrrqyhgynefdvgeee-----
-piykkyleq-f-----
-----qnplillllasa--fvsiv
mkqx-----ddais
itva-v-----vivvtvgfvqe-----yr-----se--kt
leqltk--lv-----

-----ppt-chv-----
-----lrd-----gk--eam-----m
l-----
-----areLVPGDIVLLnt-----
-----GDRIPSDLRIAes-----

-----f--slqIDESSLTGETEPKHket--

-----XXXXXXXXXXXXX
xxl-----
-----t-----CIAFM--GTLV-----
ca--grgr-----gIVISTAANSQFGevvkmmmg-----

-----eespktpkqsmddlgkqlsiysfgviavif
-ligmfqgr-----nvvdmtigVSLAVAA
IPEGLPIVvAVTLAIGVM-RMakrr-----

-----aVVK-KMPAVETLGCVTVICSDKTG-----
-----TLTKNEMTAq-----aiatpegkl-----

-----xxx
xxxxxsaeggVVXXXXXXXXXXXXXXXXXXXX-----
-----ri
ieag|vc-----nnat-----
-----ixxx-----

-----kl igqpte-gai vvl-----xxxxx-----
-----legvxx-----

-----eykr l rempfssdtk-wmgvxxxxx-----

-----xxxxxxx-----
-i-----k-----
-----gal
d-----rvldqcgtyyssdnx-----

rkqcdqysrqhi-leigkel-gqk-g lrvLGLARGes-----
-----mqslmfLGMIGMMDPPRPGAADAISIVKAsg-VDV
KLITGDAMETAQSIGQSLGI-----lss-----

-----xxsc lsgqqvd-----

-----qmsdhdlel-----

```

virqv--tVFY--RASPRHKLKIVKALq-----
--al--ge-----VVAMTGDGVNDAVALKKADIGVAM--
-----xvcgtdv-----

```

-----XXXXXXXXXX-----

i

m—

-----XXXXXXXXXXXXX-----
-----XXXXXXXXXX-----XXX
aselpvsevas-----
-----i l q-----ad l q n g l n k c e-----
-----vshrrafhgwnefd i s e d e-----
-plwky i s q -f-----knplim l l l a s a-----visv l
mhqx-----ddavs
i t v a - i -----l i v v t v a f v q e-----y r-----s e-----k s
l e e l s k -----l v-----
-----p p e - c h c-----
-----v r e-----g k-----l e h-----t
l-----
-----a r d L V P G D T V C L s v-----
-----G D R V P A D L R L F e a-----

-----v--dl s IDESSLTGETTPCSKvt--

-----XXXXXXXXXXXXXXXXX-----

-----NIAFM--GTLV-----
rc---gkak-----gVVIGTGENSEFGevfkmmqa-----

-----eeapktplqksmdl l gkqlsfysfgi i g i m
-lvgwllgk-----dilemftisVSLAVAA
IPEGLPIVvTVTLALGVM-RMvkk r-----

-----a lVK-KLP l VETLGCCNV l CSDKTG-----
-----TLTKNEMTVt-----hiftdg l h-----

-----xxx
xxxxxnqfgevix--XXXXXXXXXXXXXXXXX-----
-----r i
veagcvc---ndav-----
-----i xxx-----

-----t lmgkpte--galial---xxxxx-----
-----ldg l xx-----

-----dyirkaeypfsseqk-wmavxxxxx-----

-----XXXXXXXXXXXXX-----
-m-----k-----
-----gay
e-----qvikycttyqskgq-----

t l t l t q q r d v y - q q e k a r m - g s a - - - g l r v l A L A S G p e - - - - -
 - - - - - l g q l t f L G L V G l I D P P R T G V K E A V T T L I A s g - V S I
 K M I T G D S Q E T A V A I A S R L G L - - - - - y s k - - - - -

-----pvwkkyldq-f-----

-----knplllllgsa--lvsvl
tkex-----edavs
iata-v-----lvvvtvafiqe-----yr-----se--ks
leeltk--mv-----

-----ppe-cnc-----
----lre-----gk--lqh-----l
l-----
----areLVPGDVVSLsi-----
----GDRIPADIRLTev-----

-----x-----dIIVDESSFTGEAEPCSKtd-

-----xxxxxxxx
xxl-----
-----s-----NIVFM--GTLV-----
qy--grgq-----gVVIGTGESSQFGevfkmmqa-----

-----eetpktpqksmdrlgkqltlfsgiiiglim
-ligwsqgk-----qllsmftigVSLAVAA
IPEGLPIVvMVTLVLGVL-RMakkr-----

-----vIVK-KLPIVETLGCCSVLCSDKTG-----
-----TLTANEMTVt-----qlvtsdglr-----

-----xxx
xxxxxdgqgtvcxxxxxxxxxxxxxxxxxx-----
-----kl
veagcva-----nnav-----
-----ixxx-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXX-----XXXXXXXXXX-----XXX
esftdveglcq-----
-----rlk-----ssttdglsdn-----

-----xxlekrrqtfgqnfippkkpk-----
-tflqlvwea-l-----
-----qdvltiilelaa--iisla
lsfx-----XXXXXXXXXXXXXXXXXXXXX-----xeg---eaeagwiega
ills-v-----icvvlvtafnd-----ws-----ke---kq
frglqsxxel-----

-----eqr-fav-----
----vrn-----gn-viq-----i
p-----
---vaeMVVGDMAQVky-----
---GDLLPADGVLVqg-----

-----n-dlkIDESSLTGESDHVRKsv-----

-xk-----
-----d-----PMLLS-GTHV-----
me---gsgr-----mLVTAAGVN SQSGiiftllgaxxxx-xx
-----xxxxx-----xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltklavqigkaglvsaitv
-iilvlyfvxxxxxxxxxxxxxxxxxxxx-xxxxx-yfvkf ffi gVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qsyindqhf-----

-----x-xxxxxs-x
----ispntle-----
-----mi
vnaisinxxxxkimp-----
-----pxxxgxlp-----

-----kqvgnkte-cgllgf---xx-x---
-----lkrdyap-vreqxx-----

-----eeklykvytfnsvrk-smst-----

-v-xxxx-xx---xxxxxxk-----
-----gas
e-----ivlkkcssilgtngx-----

arnfrprdrdemxkkviepm-ace---glrtICIGYRdl-----
-----xxdpepeweneaxivtdltcIAVVGIEDPVRPEVPDAIRKCQRag-ITV
RMVTGDNINTARAIAASKCGI-----iqp-g-----

-----xxx---lclegkdfnx-----
-----xxx-----
xxx-----eieqeridk-----

iwpkl--rVLA--RSSPTDKHTLVKGLi-----
--dsxxle-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFSSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatppt-ea-----lllrkpy--g-rnnplisltn
m-knilghgvy--qlviiiftllf-----
-vgekix-xx-xxxxxxxxxxx-----
ps----ehytiifntfvlmqlfn-einarkixxernvf--x--gixanpifcsivlgt
fgvqviv--qf--ggk-----pfscapl-----
-----nveqwl--wc--lfvgvgellwg-----
-----qviatv-----

-----ptshlx-----xxx-----
--xxxxxxxxxxx-----

-----xxxxxx-xxxxxx-----xxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxx-----

-----xxxxxxx-xxxx-xxxx-----xxxxxx-xxxxxx-xxx
xxxxxxxxxxxxxxxxxxxx-xx
xxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxx

|
>drell_IIB04 XP_687129.1

m-----

-----XXXXXXXXXXXXXXXXXXXXX-----XXX-----
-----XXXXXXXX-----XXXXXXXX-----XXX
ecygdvqglcs-----
-----klk-----sspieglsghp-----
-----xxiarrkeefgknfippkkpk-----
-tflqlvwea-l-----qdvltliilevaa--iislg
lsfx-----XXXXXXXXXXXXXXXXXXXXX-----xeg-----eaeagwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke-----kq
frglqsxxeq-----
-----eqr-ftv-----
-----lrg-----gq-viq-----i
p-----vselVVGDI AQVky-----
-----GDLLPADGVLlg-----

-----n--dIkIDESSLTGESDHVKKtI--

-xk-----
-----d-----PILLS--GTHV-----
me---gsgk-----mLVTA VGVNSQTGi ifm lggxxxxxxx
-----xxxxx-----xxxxxxx-xxxxxxx
xx-xxxxxxxxxxxxxxxxxx---xxxxxx-pkkeksv lqgkl tk lavqigkaglfmsaitv
-lilvvlflxxxxxxxxxxxxxxxxxx-----xxxxx-----ffvkffii gVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qvfiagrhf-----

-----x-xxxxxd--x
-----ipgnimn-----
-----||
vtgigvnxxxxxkims-----
-----axxxgxlp-----

-----rqvgnkte--callgf---xx-x---
-----l rkdyqa--ircexx-----

-----eeklykvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----illkkocki ltsngx-----

akhfrptdrddmxtqviepm--ase---glrtlCLAYRdf-----
-----xxxdgepdwdnegxiltgltcICVVGIEDPVRPEVPDAIKKCQRag-ITV
RMVTGDNINTARAIAKCGI-----lhi--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----evskngldk-----

vwpkI--rVLA--RSSPTDKHTLVKGIi-----
---dsxxle-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFSSIVkaVMWGRNVYDSISKFL-----Q
fqI-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatפט-es-----lllrkpy--g-rnkplisrtm
m-knilghavy--qItiiftllf-----
-ageqix-xx-xxxxxxxxxxx-----
ps---ehytvfvntfvImqlfn-einarkixxernvf--x--gixnniifcsilfgt
fiiqfviv--qf--ggk-----pfscvgl-----
-----sveqwl---wc--vflgfgsllwg-----
-----qvistv-----

-----ptrrlx-----xxx-----
---xxxxxxxxxxx-----

-----qdvltiilevaa--ivslg
lsfx-----xxxxxxxxxxxxxxxxx-x-----xee--egetgwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke--kq
frglqsxxeq-----

-----eqk-fsv-----
----vrg-----gq-viq-----i
h-----
----vaeIVVGDIAQIky-----
----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDHVKKsl--

-xk-----
-----d-----AMLLS--GTHV-----
me--gsgk-----iVVTAVGVNSQTGiiftllgaxxxxxxx
xxxxxxxxxxxxxxxx-----xxxxxxxx-xxxxxxxx
xx-xxxxxxxxxxxxxxxx-xxxxxx-pkkeksvlqgkltklavqigkagllmsaitv
-iilvvlfvxxxxxxxxxxxxxxxx-----xxxxx-----ffvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qvfiadkhy-----

-----x-xxxxxd--x
----vpastmd-----
-----||
ivgisvnxxxxkims-----
-----pxxxgxin-----

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
kihggteglte-----

-----kls-----tsiasgistse-----

-----xxlsvrkeiyginqftespr-----
-gfwlfvwea-l-----
-----qdttlmilaaca--fvsl
vgi-----xme--gwpigahdglg
ivas-i-----llvvfvatatsd-----yr-----qs----lq
fkdlldax-kk-----

-----kiv-vqv-----
-----trd-----kl--rqk-----i
s-----
----iydLLPGDVVHLgi-----
----GDQIPADGLFIsg-----

-----f--svlINESSLTGESEPVSVsv-

-----xx-----

-----PFLLS--GTKV-----
qd--gsck-----mLVTTVGMRTQWGklmatlse-----

-----ggddetplqvklngvatiigkiglffavitf
-avlvqglaxxx-xxxxxxxxxxxxx-----xxx-----amleyfavaVTIVVVA
VPEGLPLAvTLSLAFAMK-KMmndk-----

-----aLVR-NLAACETMGSATTICSDKTG-----
-----TLTTNHMTVv-----kaciceqa-----

-----x-xxxxxdxxx
xxxxxipesavk-----
-----||
lqsiftn--xxgeiv-----
-----vxxn-kt-----

-----eilgtp-te-tal-lef---xx-x---
-----lggdfqe-vrq-----

-----asnvvkvepfnstkk-rmgv-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----ivldscdkyinkdgx-----

vvpldekstshl-kniieef--ase---alrtLCLAYFei-----
-----gdefsl-eapi-psggytcIGIVGIKDPVRPGVKESVAICKSag-ITV
RMVTGDNLTTAKAIARECGI-----ltd--d-----

-----x-----iaiegpefr-----

-----eksdeellk-----

lipkl--qVMA--RSSPMDKHTLVRLlr-----
--tm-xqe-----VVAVTGDGTNDAPALHEADIGLAM--
-----xisgtev-----
-----AKESADVILd-DNFSTIVtvAKWGRSVYINIQKFV-----Q
fql-tvn-v-valivnflsacitg-----n--apltavqllwv
nmimdtlgalaateppq-dd-----lmkrspv--g-rkgnfisnvm
w-rnilgqsly--qlviiwclqt-----
-kgktmx-xx----xxx--xx-----
dl---tIntlifnifvfcqvfn-eissremx-kidvf--x--gixknyvfvavltct
vvfqviii--el--lgt-----fadttpl-----
-----nlgqwl----vs--iilgflgmpva-----
-----aalkmi-----

-----pvgsh-----

-
>athII_IIB02 NP_195479.1

m-----

-----XXXXXX-----XX-XXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX-XXX-----

-----XXXXXXXX-----XXXXXXXX-----
kfhhgvvdglag-----

-----klk-----asptdglstea-----

-----xxlsqrqelfginkfaesemr-----
-gfwwfvwea-l-----

-----qdmtlmi lgvca-fvsl i
vgi-----xte-gwpkgshdg lg
iaas-i-----llvvvtatsd-----yr-----qs----l q
frldkx-kk-----

-----kit-vqv-----
-----trn-----gf-rqk-----l
s-----
-----iydLLPGDIVHLai-----
-----GDQVPADGLFLsg-----

-----f--svvIDESSLTGESEPVMVna-

-----q-----
-----n-----PFLMS--GTKV-----
qd---gsck-----mMITTVGMRTQWGklmatlte-----

-----ggddetplqvklngvatiigkiglffavtf
-avlvqgmfxxx-xxxxxxxxxxxx-xxx-----elleyfaiaVTIVVVA
VPEGLPLAvTLSLAFAMK-KMmndk-----

-----aLVR-HLAACETMGsATTICSDKTG-----
-----TLTTNHMTVv-----kscicmnv-----

-----x-xx--xnxxx
xxxxxipesavk-----
-----||
iqsifnn--xxgevv-----
-----vxxxg-kt-----

-----elgtpte--taillel---xx-x-----
-----lggkfqe--erk-----

-----sykvikvepfnstkk-rmgv-----

-----v-xxxxx-xx---xxxxxxk-----
-----gas
e-----ivlaacdkvvnssgx-----

vvpldeesikyl-nvtinef--ane---alrtLCLAYMdi-----
-----eggfspddai-pasgftcVGIVGIKDPVRPGVKESVELCRRag-ITV
RMVTGDNINTAKAIARECGI-----ltd--d-----

-----x-----iaiegpvfr-----
-----eknqeelle-----

lipki--qVMA--RSSPMDKHTLVKQLr-----
---tt-xde-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiagtev-----

-----AKESADVILd-DNFSTIVtvAKWGRSVYINIQKFV-----Q
fqI-tvn-v-valvvnfssactlg-----s--apltavqllwv
nmimdtlgalaateppn-de-----lmkrIpv--g-rrgnfitnam
w-rnilgqavy--qfiviwilqa-----
-kgkamx-xx---xxx---xx-----
tl---mIntlifncfvfcqvfn-eissremx-eidvf---x---gixdnyvfvvvigat
vffqiiii--ef--lgt-----fasttpl-----
-----titqwi---fs--ifigflgmpia-----
-----aglkti-----

-----pv-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).

m

-----XXXXX-----XX-XXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXX-----XXXXXXXXXX-----
 aqkggveelak-----

-----kvs-----vs|segi rsse-----

-----vpirekifgenrytekar-----
-----sf|mfvwea-|-----

-sf|mfvwea-|-----

-----hdi t l i i l m v c a--v v s i g
v g v-----x t e--g f p r g m y d g t g
i l l s-i-----l l v m v t a i s d-----y k-----q s----l q
f r d l d r x-k k-----

-----k i i-v q v-----
----t r d-----g s--r q e-----i
s-----
----i h d L V G D V V H L s i-----
----G D Q V P A D G I F l s g-----

-----y--n l e I D E S S L S G E S E P S H V n k-----

--e-----
-----k-----P F L L S--G T K V-----
q n--g s a k-----m L V T T V G M R T E W G k l m e t l v d-----

-----g g e d e t p l q v k l n g v a t i i g k i g l s f a v l t f
-v v l c i r f v x x x-x x x x x x x x x x x x-----x x x-----t l l d y f a i s V T I I V V A
V P E G L P L A v T L S L A F A M K-K L m s d r-----

-----a L V R-H L A A C E T M G S S T C I C T D K T G-----
-----T L T T N H M V V n-----k v w i c d k v-----

-----x x x x x g x x x
x x x x x l s e e v q s-----
-----t l
l q g i f q n--x x s e v v-----
-----k x x x g-n t-----

qilgspte—railef—xx-x—
lggdfnt—qrk—
ehkilkiepfnsdkk—kmsv—
—l—xxxx—xx—xxxxxxk—
gas
e—ivlkmcenvvdsngx—
svplteeritsi—sdiiegf—ase—alrtLCLVYKdl—
—deapsgexpdggymVAVVGIKDPVRPGVREAVQTCQAag—ITV
RMVTGDNISTAKAIAKECGI—yte—g—
x—laiegsefr—
dlsphemra—
iipki—qVMA—RSLPLDKHTLVSNLr—
—ki—ge—VVAVTGDGTNDAPALHEADIGLAM—
—xiagtev—
AKENADVIMd—DNEFTIVnvARWGRAVYINIQKFV—Q

fql-tvn-v-vali infvsacitg-----s-apltavqllw
nmimdtlg alateppn-eg-----lmkrapj-a-rtasfitktm
w-rniagqsvy-qlivlgi lnf-----
-agkslx-xx-----xxx-xx-----
ta---v lntvifnsfvfcqvfn-einsreix-kinvf--x---gmxnswvftwvmtvt
vvfqviiv-ef-lga-----fastvpl-----
-----swqhw l-----ls- iligslnmiva-----
-----vilkcv-----

>athll_IIB04 NP_179879.1

[illegible]

-----aLVR-HLAACETMGSATTICSDKTG-----
-----TLTTNHMTVv-----kscicmnv-----

-----x-xx--xsxxx
xxxxxi peaalk-----
-----||
lqlifnn--xxgevv-----
-----vxxxg-kt-----

-----eilgtpte--tailel---xx-x---
-----lggkfqe--erq-----

-----snkvikvepfnstkk-rmgv-----

-----v-xxxxx-xx---xxxxxxk-----
-----gas
e-----ivlaacdkvinssgx-----

vvplddesikfl-nvtidef--ane---alrtLCLAYMdi-----
-----esgfsadegi-pekgtfcIGIVGIKDPVRPGVRESVELCRRag-IMV
RMVTGDNINTAKAIARECGI-----ltd--d-----

-----x-----iaiegpvfr-----

-----eknqeemle-----

lipki—qVMA—RSSPMDKHTLVKQLr-----
 ---tt-xde-----VVAVTGDGTNDAPALHEADIGLAM---
 -----xiagtev-----

—pV—

m-

XXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXX
XXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXX
XXXXX
XXXXXXXXX
eqygggtqglan
llktnpekgisgdd
xxllkrktiysntyprrkkgk
gflrflwda-c
hdltliilmvaa-vasla
lgi-xte-gikegwydggs
iafa-v-ilvivvtavsd-yk-qs-lq
fqnlndx-kr
nih-lev
lrg-gr-rve-i
s
iydIVVGdVlPLni
GNQVPADGVLlsg

vapmtddkasff-kngindm--agr---tlrcVALAFRty-----
-----xxxxxptgeelskwvxpeddliiLAIVGIKDPCRPGVKDSVVLCCQNag-VKV
RMVTGDNVQTARAI ALECGI-----lss--d-----

-----xxxxxxtliegksfr-----

-----emtdaerdk-----

isdki--sVMG--RSSPNDKLLL VQSLr-----
--rq--gh-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiagtev-----

-----AKESSDIIILd-DNFASVVkvVRWGRSVYANIQKFI-----Q
fqI-tvn-v-aalvinvvaai ssg-----d--vpltavqllwv
nlimdtlgala lateppt-dh-----lmgrppv--g-rkeplitnim
w-rnlliqaiy--qvsvlltlnf-----
-rgisix-xx-----xxxxxxx-----
tr---vkntiifnafvlcqafn-efnarkpx-eknif---x---gvxknrlfmgii vit
lvlqvii v--ef--lgk-----fasttkl-----
-----nwkwql---ic--vgigviswpla-----
-----lvgkfi-----

-----pvpaax-----xxx-----

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XXXXX XXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXX XXX

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qyggvgvae

klk snmeqginede

xxvidrknafgsntypkkkgk

-nffmflwea-w

-----qdltliliiiaa--vtsla
lgi-----xte--glkegwldggs
iafa-v-----llvivvtavsd-----yr-----qs----lq
fqnlndx-kr-----

-----niq-lev-----
----mrg-----gr--tvk-----i
s-----
----iydVVVGdVlPlri-----
----GDQVPADGVLIsg-----

-----h--slaIDESSMTGESKIVHKdq-

--k-----
-----s-----PFLMS--GCKV-----
ad--gvgn-----mLVtGVGINTEWGIImasise-----

-----dtgeetplqvr lnglatfigivglsvall
-vallvryfxxxxxxxxxxxxxxxxx-----xxxxx--xxxxdcvkiftiaVTIVVVA
VPEGLPLAvTLTLAYSMR-KMmadk-----

-----aLVR-RLSACETMGsATTICSDKTG-----
-----TLTLNQMTVv-----etyaggskm-----

-----d-xx
xxxxxlhpkiva-----
-----li
segvaqn--xxgnif-----
-----hxxxgxev-----

-----e i s g s p t e - k a i l s w ----- x x - x -----

-----l gmkf dt--irs-----

-----esai ihafpfnskk-rggv-----

-a-xxx--xxx---xxxxxxk-----

-----gaa

e-----ivlacctqymdsngx-----

```
lqsiesqk-eff-rvaidsm--akn---slrcVA|ACRtq-----
```

-----xxxxxxkeqedldkwaxpedeli|LA|VG|KDPCRPGVREAVR|CTsag-VKV

RMVTGDNLTAKAIALECGI-----|ss--d-----

-----xxxxxxxtiiegkvfr-----

-----elsekereg-----

vakk i--tVMG--RSSPNDKLLL VQALr-----

---kn---gd-----VVAVTGDGTNDAPALHEADIGLSM---

-----xisgtev-----

-----AKESSDIIILd-DNFASVkvVRWGRSVYANIQKF|-----Q

-----pvpktx-----xxx-----

-----xxxxxxxxxxxx-----
-----xxxxxx-----

m

XXX

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XXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--XXXXXXXXXXXX--XXX--

-----XXXXXXXX-----XXXXXX-----
qelggvrglsd-----

-----llk-----tnlekgihgdd-----

-----xxilkrksafgsntypqkkgr-----
-sfwrfvwea-s-----
-----qdtliilivaa--vasla
lgi-----xte--giekgwydgis
iafa-v-----llvivvtatsd-----yr-----qs--lq
fqnl nex-kr-----

-----nir-lev-----
----trd-----gr--rve-----i
s-----
----iydIVGDVlPLni-----
----GDQVPADGVLVag-----

-----h--slaVDESSMTGESKlVQKns--

-xk-----
-----h-----PFLMS--GCKV-----
ad--gngt-----mLVtGVGVNTEWGlmasvse-----

-----dnggetplqvr lngvatfigivgl tvagvvl
-fvlvryfxxxxxxxxxxxxxxxxxxxx--xxxxx--xxxxdlveiftvaVTlVVVA
VPEGLPLAvTLTLAYSMR-KMmadk-----

-----aLVR-RLSACETMGSATTICSDKTG-----
-----TLTLNEMTVv-----ecyag|qkm-----

-----d-xx
xxxxx|psafts-----
-----i|
vegi|ahn--xxgsvf-----
-----rxxxg-ei-----

-----qvsgspte--railnw---xx-x---
-----lgmdfda--lks-----

-----essavqffpf|nsekk-rggv-----

-----a-xxx-xxx---xxxxxxk-----
-----gaa
e-----iv|gscthy|desex-----

fvdmsedkmggl-kdaiddm--aar---slrcVAIAFRtf-----
-----xxxxxtdeeq|srwexpeddi|LAIVG|KDP|CRPGVKN|SVLLCQ|ag-VKV
RMVTGDNIQTAKAIALECGI-----las--d-----

-----xxxxxxnl|iegkvfr-----

-----syseeerdr-----

iceei--sVMG--RSSPNDKLLLVSLSk-----
--rr--gh-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiqgtev-----

-----AKEKSDIIILd-DNFESVVKVVRWGRSVYANIQKFI-----Q
fql-tvn-v-aalvinvvaaisag-----e-vpltavqllwv
nlimdtlgalaateppt-dh-----lmdrapv--g-rreplitnim
w-rnlfiqamy--qvtvllilnf-----
-rgisix-----xxxxxxx-----
er----vkntvifnafvicqvfn-efnarkpx-einif--x--gvxrnhlfvgiisit
ivlqvviv--ef--lgt-----fasttkl-----
-----dwemwl--vc--igigsiswpla-----
-----vigkli-----

-----pvpetx-----xxx-----

-----xxxxxx-----
-----xxxxxxx-----

-
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m-----

-----xxxxx-----xx-xxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxx
xx-xxxxxxxxxxxxxxxxxxxx-xxx-----
-----xxxxxxxx-----xxxxxxxx-----
tkiggpegiaq-----
-----kvs-----vslaegvrsse-----
-----lhirekiygenrytekpar-----
-sfltfvwea-l-----
-----qditliilmvca--vvsig
vgv-----xte--gfpkgmydgtg
ills-i-----ilvvmvtaisd-----yk-----qs----lq
frldlrx-kk-----
-----kii-iqv-----
-----trd-----gs--rqe-----v
s-----
----ihdLVVGDVVHLsi-----
----GDQVPADGIFIs-----

svplseekias-i-sdviegf-ase---alrtLCLVYTdl-----
-----deaprgd xpnggyt|VAVVG|KDPVRPGVREAVQTCQAag-ITV
RMVTGDNISTAKAIAKECGI-----lta-g-----

-----x-----vaiegsdfr-----
-----nlpphemra-----

ilpki-qVMA-RSLPLDKHTLVNNLr-----
--km-ge-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiagtev-----

-----AKENADVIMd-DNFATIVnvAKWGRAVYINIQKFV-----Q
fq|-tvn-v-valiinfvsacitg-----s-apltavqllwv
nmimdtlgalaateppn-eg-----lmkrqpi-g-rtasfitram
w-rniigqsiy-qlivlgilnf-----
-agkqix-xx---xxx---xx-----
ti---vIntiifnsfvfcqvfn-evnsreix-kinvf---x---gmxkswvfavmtat
vgfqviiv-ef--lga-----fastvpl-----
-----swqhw|---lc--iligsvsmila-----
-----vglkci-----

-----pvesnx-----

[illegible]

-----kdltilillvca--ifslg
fgi-----xeh--gikegwyeggs
ifva-v-----flvivvsalsn-----fr-----qe---rq
fdklskx-sn-----

-----nik-vev-----
-----lrd-----sr--rqh-----i
s-----
----ifdVVVGDDVFLki-----
----GDQIPADGLFLeg-----

-----h--slqVDESSMTGESDHLEVdh-

-xd-----
-----n-----PFLFS--GTKI-----
vd---gfaq-----mLVVSVGMSTTWGqtmssinq-----

-----dssertplqvrldtltstigkigtvaalvl
-vvllyryfxxxxxxx-xxxxxxx-----xxxxx--xxxxsvvriavaaVTIVVVA
IPEGLPLAvTLTLAYSMK-RMmsdq-----

-----aMVR-KLSACETMGsATVICTDKTG-----
-----TLTLNEMKVt-----kfwlgqesi-----

-----xx
xxxxxispdvld-----
-----||
yqgtgln---xxgsvc-----
-----vxxxgxtp-----

efsgspte—kallsw—xxxx—
lgmdmes—vkq—
khevlrvetfssakk—rsgv—
—l—xxxxxxxxxxxxk—
gaa
e—mvlamcshyytstgx—
vdlmdstaksri—qaiiqgm—aas—slrcIAFAHKia—xxxxxx—
eedglitIMGIVGLKDP CRPGVSKAVETCKLag—VTI
KMITGDNVFTAKAIAFECGI—ldh—n—
xxxxxxavvegqvqfr—
nytdeermq—
kvdk i—rVMA—RSSPSDKLLMVKCLr—
lk—gh—VVAVTGDGTNDAPALKEADIGLSM—
xiqgtev—
AKESSDIVILd—DNFASVAtvLKWGRCVYNNIQKFI—Q

fql-tvn-v-aalvinfiaaisag-----e-vpltavqlllw
nlimdtlgalaterpt-ne-----llkrkpvg-rtealitnm
w-rnllvqsly--qiavllilqf-----
-kgmsixxxx-----
ke---vkdtlifntfvlcqvfnefnaremx-kknvf--x---glxrnrlfigiiait
ivlqvimv--ef--lkk-----fadtvr|-----
-----ngwqwg---tc--ialaslswpig-----
-----fftkfi-----

p

-----XXXXXXXXXXXX-XXXXXXXX-XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-XXX
ecygdvqict-----

-----klk-----tspneglsgnp-----

-----xxierreavfgknfippkkpk-----
-tflqlvwea-l-----
-----qdvltliileiaa--vvslg
lsfx-----XXXXXXXXXXXXXXXXX-x-----xee--eseagwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke--kq
frglqsxxeq-----

-----eqk-ftv-----
-----irg-----gq-viq-----i
p-----
-----vadlIVGDIAQVky-----
-----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDHVKKsI-

-----xr-----
-----d-----PMLLS--GTHV-----
me--gsgr-----mVVTAVGVNSQTGiiftllgaxxxx-xx
xxxx-xxxxx-----XXXXXXXX-XXXXXXXX
xx-XXXXXXXXXXXXXXXXXXXXXXXXX-pkkeksvlqgkltklavqigkagllmsaitv
-iilvlyfvXXXXXXXXXXXXXXXXX-----xxxxx-----yfvkffiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmr dn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qay i sekhy-----

-----x-xxxxxe-x-----
-----i pen i ma-----
-----y l-----
vtg i svnxxxxxk i l p-----
-----p xxxgx l p-----

-----rhvgnkte--ca l l gf----xx-x-----
-----l kr dy qd--vrnexx-----

-----eek l hkvytfnsvrk-smst-----

-----v-xxxx--xx----xxxxxxk-----
-----gas-----
e-----i v l k k c f k i l s a d g x-----

pkvfrprdrddixktviepm--ase----glrtlCLAFRdf-----
-----xxxepewdnenx i v t g l t c l A V V G I E D P V R P E V P D A I K K C Q R a g - I T V
RMVTGDNINTARAIALKCGI-----l n p--g-----

-----xxx--l c l e g k d f n x-----
-----xxx-----
xxx-----e i e q e r i d k-----

iwpkl--rVLA--RSSPTDKHTLVKGLi-----
--dsxxfd-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd--DNFTSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtlaslalatppt-ea-----lllrkpy--g-rnkplisrtm
m-knilghafy--qlvvvftllf-----
-agekix-xx-xxxxxxxxxxx-----
ps---ehytivfntfvmmqlfn-einarkixxernvf--x---gixnnaifctivlgt
fvvqiiiv--qf--ggk-----pfscskl-----
-----sieqwl--ws--vflmggtllwg-----
-----qlisti-----

-----ptsr lx-----xxx-----
--xxxxxxxxxxx-----

-----xxxxxx--xxxxxx-----xxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxx-----

-----xxxxxxx-xxxx-xxxx-----xxxxxx-xxxxxx-xxx
xxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxx-----xx---x-
----xxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxx-xxxx-x-----xxxxxxxx

|

>athII_IIB10 NP_188931.1

m-----

-----XXX-----
XXX-----
-----XXXXXXXXX-----XXXXXXXXX-----
eslggpnglvs-----
-----alk-----sntrlgineeg-----
-----xxiqrrrstfgsntytrqpsk-----
-glfhfvvea-f-----
-----kdtlilillgca-tlslg
fgi-----xeh-glkegwydggs
ifva-v-----flvvavsavsn-----fr-----qn-----rq
fdklskx-ss-----
-----nik-idv-----
-----vrn-----gr-rqe-----i
s-----
-ifdIVVGDIVCLni-----
-GDQVPADGVFVeg-----

vremkeddkiqf-ekiiqsm--aak---slrcIAFAYSed--xxxxxx-----
-----l-keeklsILGIIGIKDPCRPGVKKAVEDCQFag-VNI
KMITGDNIFTARAIAVECGI-----ltp--e-----

-----xxxxxxavlegekfr-----
-----nytqeerle-----

kveri--kVMA--RSSPFDKLLMVKCLk-----
---el--gh-----VVAVTGDGTNDAPALKEADIGLSM--
-----xiqgtev-----

-----AKESSDIVILd-DNFASVAtvLKWGRCVYNNIQKFI-----Q
fqI-tvn-v-aalvinfvaavsag-----d--vpltavqllwv
nlimdtlgalaatekpt-nd-----lmkkkpi--g-rvaplitnim
w-rnllaqafy--qisvllvlqf-----
-rgrsixxxx-----
ek---vkntlifntfvlcqvfn-efnarslx-kknvf---x---glxknrlfigiivvt
vvlqvvmv--ef--lkr-----faderl-----
-----nlgqwg---vc--iaiaaswpig-----
-----wlvksv-----

-----pvperx-----xxx-----

XXXXXXXX

S

[illegible]

-----XXXXXXXXXX-----XXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXX-----XXXXXXXXXX---XXX

etygeteg|cr-----

-----hlk-----tspteglagta-----

-----xxlekrklifgknfippkkpk-----

-tfiq|vwae-|-----

[illegible]

[illegible]

-----XXXXXXXX-XXXXXXXXXXXX-XXX-----

-----XXXXXXXX-----XXXXXXXX-XXX
dsyggvqtck-----

-----rlk-----tspveglsgnp-----

-----xxlekrqvfgqnfippkkak-----
-tflqlvwea-l-----
-----qdvltliileiaa--iislg
lsfx-----XXXXXXXXXXXXXXXXXXXX-eg--eaqagwiegaa
ilfs-v-----iivvlvtafnd-----ws-----ke--kq
frglqsxxeq-----

-----eqk-ftv-----
----irk-----gq-viq-----i
p-----
----vaeIVVGDIAQIky-----
----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDQVKKsl-

-xk-----
-----d-----PMLLS-GTHV-----
me--gsgr-----mVVTAVGINSQTGiiftllgaxxxx-xx
----xxxxx-----xxxx-xxxx-XXXXXXXXXX
xx-XXXXXXXXXXXXXXXXXXXXXXXX-pkkeksvlqgkltrlavqigkaglimsaitv
-iilvlyfvXXXXXXXXXXXXXXXXXXXX-xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qayvgdthy-----

-----x-xxxxxe-x-----
-----i lpkvld-----
-----l i-----
vngvainxxxxxki lp-----
-----p xxxgxlp-----

-----rqvgnkte--callgf---xx-x-----
-----lkqdyqa--vrnexx-----

-----eeklykvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas-----
e-----i i l r k o t k i l d k n g x-----

prmfkvkdrdemxkkv iepm--ach---glrtlCLAFRdf-----
-----xxdaepdwdsenx i l s d l t c l A V V G l E D P V R P E V P D A I L K C Q R a g - I T V
RMVTGDNINTARA I A T K C G l-----l l p--g-----

-----xxx---l c l e g k e f n x-----
-----xxxx-----
xxx-----eveqeqldk-----

iwpkl--rVLA--RSSPTDKHTLVKGLi-----
--dsxxgd-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatpeps-es-----lllrkpy--g-rnkplisrtm
m-knilghavy--qltiiftllf-----
-vgeklx-xx-xxxxxxxxxxx-----
pt---ehytivfntfvmmqlfn-einarkixxernvf--x---aixrnpifctvvlgt
faaqiiv--ef--ggk-----pfscsgl-----
-----tlsqwf--wc--ifigvgellwg-----
-----qlictv-----

-----ptshlx-----xxx-----
--xxxxxxxxxxx-----

-----xxxxxx-xxxxxx-----xxxxxxxxxxxxxxxxxx-----
-----xxxxxxxx-----

-----xxxxxxx-xxxx-xxxx-----xxxxxx-xxxxxx-xxx
xx-----x
xx-----xxxxxxxx

v

>cnelI_IB01 XP_570160.1

m-----

-----XXXXXXXXXXXX
XX
XX
XX-----

-----XX
ekiggvsglle-----

-----glg-----vdgakglavgt-----

-----XXXXXXXX
xxxxxxxxxxxxxxxxxxxxmdhrrei ygrndlprksk-----
-sllllmwa-f-----
-----kdkvlillsiaa--vvs la
lgxxxxxxxxxxxxxxxx-----xce--eaqvdwvegva
ivva-i-----iivlvgsind-----wq-----ke--rq
fkk lne--kr-----

-----edrxkv-----
-----irg-----gs--emv-----i
n-----
----vkdVVVG DVCLLep-----
----GEIIPVDGIFLrg-----

-----h--nvrCDESGATGESDAIKKfs--

-----xxxx-----xxxxxx-----

-----xxxxxx
xxk-----
-----d-----CFLIS--GAKV-----
le---gvge-----yVVI AVGPTSFNGr immamrg-----

-----dadetplqiklnylaeliaklggasglilf
-ivlmirffxxxxxxxxxxxxxxxx-----sfiqiliiavTLVVVA
VPEGLPLAvTLALAFATK-RMtkqn-----

-----ILVR-VLGSCETMANATVVCTDKTG-----
-----TLTQNEMTVv-----ag-----

-----x
xxxxxkfvdlsxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----lf
neaicin---staf-----
-----exxxexgkx-----

-----nfvgskte--tal lrf---xxxx-----
-----ewpdyrq--vre-----

-----saeivqmipfsseik-amgv-----

-v-----xxxxxxxxxk-----
-----gas
e-----vlsnctkhvvvhqxxxxxxxx-----

ttfdddamsni-sktiify-anq---slrtIALCYRdf-----
x--xxxxxx--xxkdeadevpyexiakdmtlIAITGIEDPLRPGVKEAVEKCQLag-VAV
KMCTGDNVLTARSIASQCGI-----fta-g-----

-----x-----vvmegpvfr-----
-----klsdsdrle-----

iaprl-qILA-RSSPEDKRLLVKTlk-----
--sm-ge-----VVGVTGDGTNDGPALKLANVGFAM--
-----xiagtev-----

-----AKEASDIILMd-DSFKNIVlaIMWGRCVNDsvKKFL-----Q
fqi-svn-i-tavfitfisavass-----sxxsvltavqllwv
nlimdtfaalatdpates-----sldrkd-r-knaplitvem
f-kmimvqaiy-qiivclvlhf-----
-aglkixx-----xxxxxxx-----
nt---elgalvfncfvfcq-----il
vggqiliv-ev-gga-----afqvtrl-----
-----ggrdwg---it--lvigalslpig-----
-----alvrlt-----

-----ptaqfx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

```
-----XXXXXXXXXXXXXXXXXXXXX-----XXXXXXXXXXXXX-----  
-----XXXXXXXXXX-----XX-----  
-----  
-----XXXXXXXXXXXXXXXXXXXXX-----XXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----  
-----XXXXXXXX
```

This image shows a full page of handwriting practice paper. It features ten identical rows of horizontal guidelines. Each row is composed of three lines: a solid top line, a dashed middle line, and a solid bottom line, providing a structured space for practicing letter formation and alignment. The paper is otherwise blank, with no text or markings other than the guidelines.

```
-----XXXXXXXXX-----XXXXXXXXX---XXX
esygdvygict-----
```

xxlerreavfgknfippkkpk
-tflqlvwea-l-

-----qdvltliileiaa--ivslg
lsfx-----xxxxxxxxxxxxxxxxx-x-----xeg--egetgwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke---kq
frglqsxxeq-----

-----eqk-ftv-----
----irg-----gq-viq-----i
p-----
----vadITVGDI AQVky-----
----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDHVKKsl--

-xk-----
-----d-----PLLLS--GTHV-----
me---gsgr-----mVVTAVGVNSQTGiiftllgaxxxx-xx
xxxxxxxxxx-----xxxxxxxxxx-xxxxxxxxxx
xx-xxxxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltklavqigkagllmsaitv
-iilvlyfvxxxxxxxxxxxxxxxxxx-----xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qayinekhy-----

-----x-xxxxxe--x
----ippnils-----
-----yI
vtgisvnxxxxxkiIp-----
-----pxxxgxIp-----

[illegible]

-----XXXXXXXXX-----XXXXXXXXXXXXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----XXX
etygdteaicr-----

-----rlk-----tspveglpgta-----

-----xxlekrkqifgqnfippkkpk-----
-tflqlvwea-l-----
-----qdvltliileiaa--iislg
lsfx-----XXXXXXXXXXXXXXXXXXXXX-----xeg--eaeagwiegaa
ills-v-----icvvlvtafnd-----ws-----ke--kq
frglqsxxeq-----

-----eqk-ftv-----
-----vra-----gq--vvq-----i
p-----
-----vaeIVVGDIAQIky-----
-----GDLLPADGLFIqg-----

-----n--dlkIDESSLTGESDQVRKsv-----

-----xk-----
-----d-----PMLLS--GTHV-----
me--gsgr-----mVVTAVGVNSQTGiiftllgaxxxx-xx
-----xxxx-----xxxxxx
xxxxxxxxxxxxxxxxxxxxx--xxxxxx-hkkeksvlqgkltklavqigkaglvmsaitv
-iilvlyftxxxxxxxxxxxxxxxxxxxxx-----xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAVTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qayvgdvhy-----

-----x-xxxxxs-x
----inaktle-----
-----||
vnaiainxkxkilp-----
-----pxxxgxlp-----

-----rqvgnkte-cgllgf---xx-x---
-----lrdyep-vrsqxx-----

-----eeklykvytfnsvrk-smst-----

-----v-xxxx-xx---xxxxxk-----
-----gas
e-----ivlkkockilsgagx-----

arvfrprdrdemxkkviepm--acd---glrtICVAYRdf-----
-----xxspepdwdnenxilineItcICVVGIEDPVRPEVPEAIRKCQRag-ITV
RMVTGDNINTARAIAIKCGI-----ihp--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----eieqeridk-----

iwpkl--rVLA--RSSPTDKHTLVKGLi-----
--dsxste-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd--DNFSSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatppt-et-----lllrkpy--g-rnkplisrtm
m-knilghavy--qltliftllf-----
-vgekmx-xx-xxxxxxxxxxx-----
ps---ehytiifntfvmmqlfn-einarkixxernvf--x---gixrnpifctivlgt
faiqiviv--qf--ggk-----pfscspl-----
-----qldqwm--wc--ifiglgelvwg-----
-----qviati-----

-----ptsr lx-----xxx-----
--xxxxxxxxxxx-----

-----xxxxxx-xxxxxx-----xxxxxxxxxxxxxxxx-----
-----xxxxxxxx-----

-----xxxxxxx-xxxx-xxxx-----xxxxxx-xxxxxx-xxx
xxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxx-xx--x-
----xxxxxxxxxxxx-xxxxxxxxxxxx-xxxx-x-----xxxxxxxx

|

>mmu11_IIB03 NP_796210.2

m-----

[illegible]

-----n--dIkIDESSLTGESDHVRKsa-

-----x-----

--k-----
-----d-----PMLLS--GTHV-----
me---gsgr-----mVVTAVGVNSQTGiiftllgaxxx-xx
-----xxxxx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltklavqigkaglvmsaitv
-iilvlyfvxxxxxxxxxxxxxxxxxxxx-xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qsylgdthy-----

-----x-xxxxxs--x
-----ltpkiid-----
-----||
vhaisinxxxxxkilp-----
-----pxxxgxlp-----

-----rqvgnkte--callgf---xx-x-----
-----lkrdfqp--vreqxx-----

-----edqlykvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----iIlkctniInsngx-----

lrgfrprdrddmxkkiiepm--acd---glrtlclAYRdf-----
-----xxiqepdwdnenxvvgdltcIAVVGIEDPVRPEVPEAIRKCQRag-ITV
RMVTGDNINTARAIAAKCGI-----iqp--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----eieqerldk-----

vwpkl--rVLA--RSSPTDKHTLVKGIi-----
---dsxxge-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q
fqI-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatפט-es-----lllrkpy--g-rdkplisrtm
m-knilghavy--qltiiftllf-----
-vgelfx-xx-xxxxxxxxxxx-----
ps---ehytiifntfvmmqlfn-einarkixxernvf--x--gixsnpiactivlgt
fgiqiviv--qf--gdk-----pfscspl-----
-----steqwl---wc--lfvgvgelvwg-----
-----qviati-----

-----ptsqIx-----xxx-----
---xxxxxxxxxxx-----

- tf | e | v | wea | -----

[illegible]

-----AKEASDILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q


```
fql-tvn-v-vavivaftgacitq-----d-splkavqmlwv
nlimdtfaslalatppte-es-----llrrrpy--g-rnkplisrtm
m-knilghavy--qllivfllvf-----
-agdtlx-xx-xxxxxxxxxxx-----
ps---qhytivfntfvlmqln-einarkixxeknvf--x--gvxrniifctvvlgt
ffcqimiv-el--ggk-----pfscstsl-----
-----tmeqwm--wc--lfigigellwg-----
-----qvissai-----
```

```
>aniII_IIB01 EAA66307.1
```

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
yalgglaglak-----

-----glr-----tdprsglsld-----

-----XXXXXXXXXXXXXXXXXXXXXXXX-----XXXXXXXX-----
xxxxxxxxxxxxxxxxxxxxxxxxysdrkrvfganklpekktk-----
-silelawla-y-----
-----ndkvllltvaa--iisla
lgix-----xxxxx-----xpg--eprvqwvegva
iiva-i-----livvvgaand-----wq-----ke--rq
fvklmkx-ke-----

-----drl-vkv-----
-----irs-----gk-mie-----i
s-----
-----ihdILVGDVMHLep-----
-----GDLVPVDGIYlg-----

-----h--nvkCDESSATGESDVLRKtp-----

-----XXXXXXXX-----

-----XXXXXXXX-----
xxm-----
-----d-----PFIVS--GAKV-----
se--gvgt-----fLVTAAGVHSTYGktmmslqd-----

-----egqttpqtklvlayiaklglaaglllf
-vvlfikflxxx--xxxxxxxxx-----x-----aflqifivaVTVIVVA
VPEGLPLAvTLALAFATT-RMikdn-----

-----nLVR-LLRACETMGNATTICSDKTG-----
-----TLTENKMTAv-----aatlgtgtr-----

-----fggrxx-----
-----||
ldsivln-----staf-----
-----exxxextm-----

-----tfigskte--tal|gf----xxxx-----
-----lg|gs|s--eard-----

-----nasivqmpvfdsgrk-cmav-----

-----v-----xxxxxxxxxxxxxk-----
-----gas
e-----vllakstrivrnptxxxx-----

egplddkdrskl-detinky--atq----slrt|GLVYRdf-----
x--xxxxxxxxxxeedrslaafdxifkdmvmFGVFGIQDPLRAGVTESVQQCQRag-VFV
RMVTGDNIVTAKAIARECGI-----ftp--g-----

-----x-----vaiegpkfr-----

-----klssrqmtq-----

iiprI--qVLA--RSSPDDKKILVSQLk-----
--kl--ge-----TVAVTGDGTNDAQALKTADVGFSM--
-----xitgtev-----

-----AKEASDIILMd-DNFASIVkaMAWGRTVNDVKKFL-----Q
fqi-tvn-i-tavlltfisavasg-----dxxsvltavqlIwv
nlimdtfaalalatdpps-py-----vlnrrpe--p-ksaplinltm
w-kmmigqsiy--qlvvtlvlnf-----
-sgrsixxxx--xxxxxxxxx-----
nn---vlttvvfntfvwmqifn-qwnsrrixglnif--x--glxrnrfiqfii
vggqilii--fv--ggh-----afsvtrl-----
-----tgaqwa--vc--lilgvisipvg-----
-----viirli-----

-----pdefix-----xxx-----xxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

-----xx
xx-----

-----xx
xx-----
-----xxxxx

s
>anill_IIB02 EAA63398.1
m-----

XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

-----XX
XXX-----XXX-----

-----XXXXXXXXX-----XXXXXXXXX-----
valgglpglan-----

-----glr-----tdlsaglstea-----

-----XXXXXXXXXXXXfadrirvfkenvlpekkat-----
-plwklmwa-y-----
-----ndkvlllltaaa-aisla
lglx-----XXXXXXXXX-----xgs-gmpldwvegca
icva-i-----vivvmvgsInd-----yq-----ke-ra
fvklmkx-ke-----

-----dre-vtv-----
-----irs-----gk-avr-----l
s-----
-----vheVLVGDIHLep-----
-----GDLVPVDGIFIdg-----

-----h--nvkCDESSATGESDQLKktg-

-----XXXXXXXXXXXXXXXXXXXX-

-----d-----PFllS--GSKV-----
le---gvgt-----cLVTSVGVNSSYGkiImamrq-----

-----dmeptplqkkldrIasaiaklgassaiflf
-lillfrflXXXXXXXXXXXXXXXX-----qvtdilivalTVIVVA
VPEGLPLAvTLALAFATT-RMvkln-----

-----nLVR-VLKSCETMGNATTVCSDKTG-----
-----TLTTNKMTVv-----tgtfgdedf-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-
-----mi
iesvain---staf-----
-----exxxnxvp-----

-----gfvgskte--talIgf---xxxx-----
-----lgmgpla--evra-----

-----natvvqImpfdsgrk-cmga-----

-v-----XXXXXXXXXXXXXk-----
-----gas
e-----illryssfvrpsg-----

pvd|vsserer|eqvildy--akq---slrt|ALVSRef-----
x--xxxxxxx-xxpddpsqad|gx|lqmsf|GVVG|QDP|IRPGVPEAVAKCHHag-VAV
RMVTGDNMVTAKA|ATDCG|-----yt--g-----

-----x-----vmegphfr-----
-----t|sdaefde-----

v|pq|--qVLA--RSSPEDKR|LVTKLr-----
--al--ge-----|VAVTGDGTNDGPALKAAN|GFSM--
-----xiagtev-----

-----AKEASA|VLMd--DNFSSILtaLMWGRAVND|AVRKFL-----Q
fqi-tvn-i-tavlltfissvads-----exxsvltavqllwi
nlimds|aalalatdppt-ee-----ilnrkpi--k-ggapl|sitm
w-kmiigqsif--qlivt|tlhf-----
-gprqnxvxx-----x-----
dd---vrrsivfntfvwmqifn-efnnrrlxxrfnif--x--glxrnwffigincim
vgcqivia--fy--gga-----afsivqi-----
-----hdeqwa---ic--ilvaaislpwa-----
-----vvvrlf-----

-----pdawfx-----xxx-----xxxxxxxxx-----

[illegible]

[illegible]

efigskte--vallql---xxxx--
lgmdvat--era--
satiqlipfdsark-cmgv--
-v-----xxxxxxxxxxxxk--
-----gaa
e-----mmvdkcsnrinydsxxxx--
iepaaakdkqei-leiiesy--akk---slrtlGLVYKdf-----
xxxxxxxxxxxxxxxxqddpdsafdxifhdmwLGVMGlQDPLRPEVPAAIERCHVag-VQV
KMVTGDNINTATAIAESCGl-----kte--d-----
-----x-----iamegptfr--
-----r lseeemdk--
vipr l--qVLA--RSSPEDKRILVARLk-----
--kl--ge-----TVAVTGDGTNDGPALKTADVGFSM--
--xiagtev--
-----AKEASSIILLd-DNFKSIVtaIAWGRAVNDAVAKFL-----Q

-----pdkpvx-----

```
r
>aniII_IIB04 EAA60183.1
```

This image shows a handwriting practice sheet. It features ten sets of horizontal guidelines, each consisting of a solid top line, a dashed middle line, and a solid bottom line. At the bottom right of the page, there is a single row of twenty 'X' marks for tracing practice. The first letter 'm' from the previous image is visible at the very top left corner.

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
gtfgglrglek-----

-----glr-----tnvqsglsld-----

-----XXXXXXXXXXXXXXXX-----XXXXXXXX-----
XXXXXXXXXXXXXXXXXXXXfvdrqrvfgtnklpekklk-----
-siwelvwia-y-----
-----ndkvlllsfaa--lvslv
vgix-----xxvr--gtgvewvegaa
iaa-i-----vvvvtvgaand-----wq-----ke--rq
faklnkx-ke-----

-----dry-vkv-----
----irs-----gq--ise-----v
s-----
----tydIIAGDVMYLep-----
----GDMIPADGILleg-----

-----h--gvkCDESSVTGESDLLRKtp--

-----XXXXXXXXXXXXXXXX-----

-----PFIMS--GSSV-----
ee--gtgt-----fLVtATGVHTTYGrtvmslqd-----

-----egeitplqvklaladyiakvgltsgliif
-vvlfikflxxx--XXXXXXXXXXXX--x-----aflrilivaVTIVVVA
VPEGLPLAvTLALAFATT-RMikdn-----

-----nLVR-LLRACETMGNATTICSDKTG-----
-----TLTQNKMIv-----aatldtasq-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----hl
lqsialn-----staf-----
-----exxxdxvt-----

-----tfigskte-tallsf-----xxxx-----
-----lglgpva-eera-----

-----naeivqmfpfdssrk-cmav-----

-----v-----XXXXXXXXXXXXXk-----
-----gaa
e-----iIlrqsaqivqdatxxxx-----

avplseeakitl-dtiitdy-asr-----slrcIALVHRdf-----
x-----XXXXXXXXXXene-----mavfexifkdmtmLGIFGIQDPVREGVPDAVRQCQHag-VFV
RMVTGDNIITAKAIAQQCGI-----ytp-g-----

-----x-----vaiegpefr-----

-----elshdqmnk-----

lipr l--qVIA--RSSPDDKKILVSQlK-----
--el--ge-----TVAVTGDGTND AQALKTADVGFAM--
-----xvagtev-----

-----AKEASDIIMd-DNFTSIVkaIAWGRTVND AVKKFL-----Q
fql-tvn-i-tav i ltfvsavas n-----dxxpvl savqllwv
nlimdtfaalalatdpps-ph-----vlerkpe--p-ksaplitl tm
w-kmi isqaiy--qlavtlvlnf-----
-agqhix-----
pkxxxxciqtvvfntfvmqifn-qyncrrvxxrlnvi--x--gixnnrwfiaiqvii
iggqimiii--fl--ggq-----vfsvqrl-----
-----xqpsqwa--atxxiylaplegpra-----
-----rylrgk-----

-----pplrvx-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

s

>anill_IB05 EAA67021.1

m-----

-----XXXXXXXXXXXXXXXXXXXX
XXX-----
-----XXXXXXXX-----XXXXXXXX-----
yalgglqgle-----
-----glq-----tdlenglste-----
-----XXXXXXXXXXXXXXXX-----XXXXXXXX-----
xxxxxxxxxxxxxxxxxxxxfadrtrvfgtnalpsapk-----
-kfirllwda-y-----
-----ndkiiilltiaa--vvs
lgix-----xxxsg-----qsqvdwiegva
vcva-i-----aivvavtagnd-----wq-----kq-----rq
fgklmkx-kl-----
-----drs-vra-----
-----ird-----gk--ttq-----v
h-----
-----iteLTVGDIVHLdp-----
-----GDAAPADGVIIvn-----

-----h--dikDESTATGESDQVEKvs--

-----XXXXXXXXX-----

-----XXXXXX
xxi-----
-----d-----PFII S--GSKV-----
le---glgt-----yLVTSVGPSTYGr imvs l st-----

-----etdptplqvklarlagwigwfglgsallf
-fvlfrrfixxxxxxxxxxxxxxxxxx-----x-----hfmdilivaVTVIVVA
IPEGLPLAvTLALAFATA-RMiken-----

-----nLVR-LLRACETMGNATVICS DKTG-----
-----TLTQNKMSVv-----agfcsages-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----||
vhslaln---ttaf-----
-----exxtxgr-----

-----efvgnkte--iallql---xxxx-----
-----lgmdl sr--iqa-----

-----dnr ishvypfdssrk-amav-----

-v-----xxxxxxxxxxk-----
-----gap
e-----illaavqivqpgpxxxxxx-----

paqisdsdrhli-sgrinsy--ara---slrtlGIAYRdf-----
-----xxxxpnmkrtpnfsxilkaitwIGAFGlHDPLRPEVVEAlGNCHSag-VQV
KMVTGDNINTALSIAESCGl-----kte--d-----

-----x-----iamegpe| r-----
-----kldkdq| de-----

vvpkl--qVLA--RSSPNDKELLVKHLk-----
--r|--ge-----IVAVTGDGTNDGPALKAADVGFsM--
-----x|sgtdv-----

-----AREASSlLLd-DNFRSlVtalSWGRAVNDAlAKFL-----Q
fqi-tvn-i-tavlltvvtaiyns-----rxxsvfravql|wl
nlimdtfaalalatdppt-ad-----ilkrppt--p-rhaplftvtm
w-kmilgqsiy--klalcfvlyf-----
-cghsxxxxxx-----
syxxxxeldtii fntfvwmqifn-efncrrlxxrfnif--x--gixrnvwffvinlim
vggqilii--fv--gga-----afgvtrl-----
-----tgrqwg---ic--lgfavvcipwa-----
-----allklv-----

-----pdqmyx-----

-----plwsivldax-----

sdhlllllivaavvsiv
lgx-----xxxsd---hpetgwidgva
ilva-v-----ilvvgitslnd-----fk-----nq----ar
frelnxxnd-----

-----kev-----
--xxirg-----ge-qcq-----i
s-----
---ifdVKVGDIISLdt-----
---GDIIICADGVFIeg-----

-----h---alKCDESSITGESDPIKKgq-

-----xxxxx-----

-----d-----PFLIS-GSMV-----
ie---gfgt-----mLVTAAGVNNSFNKgtmmglrv-----

-----asedtplmqklsvlasrigyfgmgaaillml
-liaipkyfxxxxxxxxxxxxxxxxxxx-----pivqlvisaITIVVVA
VPEGLPLAvTMALAYGMM-KMfken-----

-----nLVR-NLASCE TMGSATTICSDKTG-----
-----TLTQNVMSVv-----tgticgvfp-----

-----xxxxxxxxxxxxxxxxxxx-----

tdgmain-----snay-----
-----exxsxgkx-----

$$\text{-----efigskte-cal ln f-----xx-x-----}$$

-----fgcdyne-----vrk-----

-----r|evvelypfssark-rmsv-----

-----|-----xxxxxxxxxxxxk-----

-----gas

e-----i | l g q c g s y | d e a g-----

nirpiseakayf-eeqinnf--asd---alrtlGLAYRdf-----

-----qygecdfkexpennlvfIGIVGKDPLRPEVPEAVEICKRag-IVV

RMVTGDNLVTAQN|ARNCGI-----|te-g-----

-----x-----lcmegpkfr-----

-----e | sqsemda-----

i | p k | --qVLA--RSSPTDKQLLVGRLk-----

---dl---ge-----VVAVTGDGTNDGPALKLANVGFSM---

-----x is gtev-----

-----AIAASDVLLd-DNFASIVraVLWGRNIYDAICKFL-----Q

fql-tvn-v-vavtvafigtltsdxxxxxxxxxxxxxxxxxxxxxxxxxxspltavql|lv
nlimdtlaalateppt-pe-----l|erppn---g-knaplitrsm
w-kniigqaal--qlailftily-----
-qghnixxx-xxxxxxxxxx-----
gl---hhytlvfncfvflqlfn-einarv|xxrtnpf---x---nfxnnpifiavmift
lgvqiifv--tf--ggs-----atstdsl-----
-----yivewi---cc--vvvgaislpvg-----
-----lllrki-----

n

This image is a handwriting practice sheet for the letter 'm'. It begins with a large, bold lowercase 'm' in the top left corner. To the right of the 'm' and below it are ten rows of horizontal dashed lines, each row starting with a small 'm' for tracing. The entire sheet is designed for practicing the formation of the letter 'm' through tracing and independent writing.

XXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

qryggvsglsk

rlg sneenglsqqe

xxneer i h r f g i n k m n e i a q k

slffffiwqa-i

hdktliilivsa-vvsiilgl-xve-drktgwidgta

ilva-v-iivvlvtagnd-yn-ke-kk

frklntx-rn

ern-vsv

vrg-gh-las-i

s

vydVVVGDVVKLet

GDTIPADGLYlag

q-siaVDESSMTGESDQKRKs

xd

r-PFFLS-GCQV

le-gsas-mLVI AVGPNSQWGkikllqs

pdsdtpItqkleklaetigkfgliaaift

gvlllkyvxxxxxxxxxxxxxxxxx-tivgfvvtalTIIVVA

VPEGLPLAvTISLAYSM-Mmmdg

nLVRHLEACETMGGATNICSDKTG
TLTQNRMTVvkkii gksin

xxxxxxxxxxxxxxx
xxxxxiyspsxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
||
aegislnstay
ixxtxr|x

dhigsktecallewxxxx
pnqsyetvrkex

kdrvkvypfssekkmsav

|xxxxxxxxx—xxxxxxk
gaa
eivlnnctni vdkngx

stqmsrdekml|—qkdiefase—glrtLVLAYKei
xnepssedeakxytgltfLGLVGIKDPVRKEVPRAVKRCQGagIFV
RMLTGDNILTAKNIARECGI—lkd—g

x—vaiegpqfr
lltddqldt

i i p h l -- q V I A -- R C S P T D K F R L V H R L r -----
-- e l -- g e ----- V V A V T G D G V N D A P Q L K E A D V G F S M --
----- x i a g t e v -----

----- A K E A S D I V L L d - D N F N S I A k a V I W G R N V Y D S I R K F I ----- Q
f q l - t v n - i - v a v l i a f v g s i t n g ----- e - s p l r p v q l l w v
n l i m d t l g a l a l s t e p p s - e e ----- l f n r r p y -- g - r f d s l i t y r m
w - r n i i g q s i y - q i a f l f s i m y -----
- s a a s m x - x x x x x x x x x x x x x x -----
k t -- v y h t i i f n t f v f c q f f n - e i n c r v l x x q l n v f -- x -- n i x k s y v f v g v v s f c
i f i q v i l v - e f - g g e ----- f f g t r h l -----
----- d y k q w f -- f c - i i i g f g s l i w g -----
----- f c l r l l -----

----- p l k d r x ----- x x x x x x x x x x x x x x x x x x
x x x x x x x x x x x x x x x x x x -----

----- x x x x x x x x x x x x x x x x x x ----- x x x x x x x x x x x x -----
----- x x x x x x x x -----

----- x x x x x

s

> d d i l l _ I I B 0 3 X P _ 6 3 8 4 9 6 . 1

m -----

xkyhfqgl sdnk
 vkenrekysntlppveie
 -sffsk-lmexf
 qdplihilcval--vitvi
 lsfx
 gyaewfegvg
 iasa-v flatfvstyse yk ne ns
 fqe|qexxsr
 vkc
 -xxrng sh ise v
 y
 gfdVVVGDLVLLqa
 GDKIPADGRLVag

-----ipdsvgl-tnsinsl-seq---girvI AVAVSre-----
-----plvetexlpnsliI VGIVGVYDEIREESRSSIQTARSag-IQV
VMI TGDKKETAI AVAHQIGL-----isp--g-----

-----xxxxxxvvI tsfelq-----

-----nI sdnkI an-----

mI phI--rVVS--RALPSDKVRFVNVAq-----
---sI--hk-----VVGMTGDGVNDSAALKHADVGfAM--
-----gsgsev-----

-----SKEAADIVILd-DNFASITqaVLYGRTIYKSIQKFI-----V
fqs-tin-v-astIivflgpfmgf-----d--fpltlIqlIwv
nIvmdtIaalaIafggepal-tr-----ymqekpi--k-rdqsiitsrm
w-gsIlgggpfxxamsiIfltnDxxxxxxxxx-----

gexxxxafI taffaffiIsvin-afnvrts--rInI fx-----hlxdnkgfi vvvffi
ffvqivft--yi--gk-----ilrtvgI-----
-----tssewa---lv--vamsfsvipd-----
-----lirkfa-----

-----InI flxxxxxxxxx-----

d

>mgrII_IB01 XP_365785.2

m

-XX
XX-
-----XX
XX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----

yklgglsglek-----

-----glr-----tdrkaglsvde-----

-----XXXXXXXX-----XXXXXXXX-----

xxxxxxxxxxxxxxxxxxfvdrkrvykdnrlpertgk-----

-sllqlmwit-f-----

-----ndklllllsgaa--aisla
vglx-----xxxxxxx-----xps--kqkvewiegva
iiva-i-----livvlvgsInd-----wq-----ke---rq
faklnkx-kt-----

-----drp-vkv-----
----irs-----gk--aqe-----i
s-----
----vhnLLVGDVVHLet-----
----GDLPVDGVLleg-----

-----h--nikCDESQATGESDLIKKr--

-----xxxxxxxxxxxxxxxxxxxx-----

--m-----
-----d-----PFIQS--GARV-----
me---gvgt-----fMVTATGVNSSYGqtImslqd-----

-----dpeitplqqklnviadgiakiggaaalllf
-lvlfikflxxxxxxxxxxxxxxxxxxxx-----x-----qfirifivvVTIIVVA
VPEGLPLAvTLALSYATK-KMvkqn-----

-----nLVR-QLKACEVMGNATTICSDKTG-----
-----TLTQNKMKVv-----egtvgtthr-----

-----fxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----vI
Irsivln---staf-----
-----exxxdxeq-----

fql-tvn-v-tavlltfvsavsnd-----rxxsvltatqllwv
nlimdtlaalalatdpvh-pt-----vld-pw-n----yipavl
c-----

```
-----pdfv-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxx-----
```

[illegible]

-----XXXXXXXXXXXXXXXXXXXX

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
yai gglaglek-----

-----glq-----tnrkeglsvde-----

-----XXX
xxxxxxxxxxxxxxxxxxxxfadkr i frdnr lpakksk-----
-sllqiawet-y-----
-----ndkililltfaa--iisla
lglx-----xxxxxxx-----xgg--gakvewvegva
ilva-i-----fivvlvgtvnd-----wq-----mq--rs
fnklnax-hd-----

-----drh-vkv-----
-----irs-----gk--sve-----l
s-----
----vydILVGDVMHLet-----
----GDLVPVDGIFlqg-----

-----h--gvkCDESSATGESDLLKktp-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXX-----
xxm-----
-----d-----PFllS--GSKV-----
ne--gtgt-----fLVTAvgVHSSYGr immtmq-----

-----gqestplqqmInkladmiayagtgsalllf
-vvlfikflxxx--xxxxxxxxxxx-----x-----tflrlfitaVTVVVVA
VPEGLPLAvTLALAFATT-RMtkdn-----

-----nLVR-VLRACETMGNATTICSDKTG-----
-----TLTQNKMTVv-----attlgtsls-----

-----xxgtdem|xx-----
-----i|
iqsnavn-----staf-----
-----exxxexeh-----

-----tyigskte-valltf-----xxxx-----
-----lgappva-evrs-----

-----nsdvvqvvpfdsalk-ymat-----

-----v-----xxxxxx-xxxxxxk-----
-----gas
e-----i||kqctrvlsdpexxxxxx-----

elt--delretf-nstitsy--agq---tlrtISSYRdf-----
x--xxxxxxx-xxkedprsadfnxvhsdmt|VSIFG|KDPLRPGVIDA|KDCKRag-VVV
RMVTGDNILTGRAIAKECGI-----ytpxxg-----

-----x-----lamegpdfr-----

-----rkseeelke-----

iapkl--qVLA--RSSPEDKRILVKILk-----
--el--ge-----TVAATGDGTNDAPALKMADIGFAM--
-----xiagtev-----

-----AKEAAAIILMd-DNFATIVkaMAWGRTVRDAVKKFL-----Q
fqI-tvn-v-tavvlvfvsavsss-----txxsvlnavqlIwv
nlimdtmaalalatdpvh-ps-----ilhrkpd--r-ksaslitpam
a-kmiigqaic--qlaitlvlnf-----
-ggyslxx-----xxxxxxx-----
ei---rIktlvfntfvwlqifn-evnnrrlxklnil---x---gvxknywflgvnlIm
iggqvlii--fv--gre-----afkivpl-----
-----dgkewg---is--iglgaisipwg-----
-----miirli-----

-----pdhwix-----xxx-----xxxxxxxxxxxxx
xxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xx-----
-----xxxxx

d

>mgrII_IB03_XP_368067.2

m-----

XXX
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 XXXXXXXX
 XX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 XX XXX
 XXXXXXXX XXXXXXXX
 dafggldglaa
 glr tdlqaglside
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXX
 XXXXXXXXXXXXXXXXXXXXXXXfvdrrrvfgenklprkqr
 sflelawiaf
 ndkliflltasa tislal
 lgix xxxxxxxx g epriqwldsvt
 vmva-i avivfgsalnd wn kn rk
 faklnex-ke
 qrd-vkv
 irs gk tmn i
 s
 iydLLVGDI MHlet
 GDVVAVDGVLVng

-----s--giqVDESSLSGESELVHKta-

-----XXXXXXXXXXXXXXXXXXXX-

-----XXXXXX
xxs-----
-----d-----PFILS--GTTV-----
ng---gvgn-----yLVISVGTNSTFGrtlmnlrt-----

-----dveetplqqklgklarqlitlgalaglvff
-lvmfirfcXXXXXXXXXXXXXXXX-----effktlilaVTVVVVT
VPEGLALAvTLGLAFATS-RMlkdk-----

-----nLVR-MIRSCEVMGNATCICSDKTG-----
-----TLTQNVMTVv-----agnigaaea-----

-----XXXXXXXXXXXX
xxxxxkaatmesXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----||
ksgivhn---ttaf-----
-----exxx-----

-----gfvgmste--tal lkf---xxxx-----
-----lamgpln--eert-----

-----nadivdmfpfdasnk-wmav-----

-m-----XXXXXXXXXXXXk-----
-----gaa
e-----vlldqctralsdpkXXXXXXXX-----

tedftpemhenl-rqvvsy--avk---mlrpVAMAYRdf-----
---xxxxxxxxvkdttidfkxkfasltfLSLFAIKDPLRPEVNDAVRKCQEag-VFV
RMVTGDNFLTAKAIAATECGI-----yta--g-----

-----x-----i amdgtfr-----
-----klseaqldl-----

vi pr l--qVLA--RSSPEDKLLLVSHLk-----
--gm--me-----TVAVTGDGTNDALALKAADVGFAM--
-----xiqgtev-----

-----AKEAASII LLd-DNFTSIVkaLSWGRTVNDAVRKFL-----Q
fqf-tin-i-tagtltvvselsg-----d--nifkvvqllwm
nlimdifaslglatdyps-pd-----flkrkpq--p-rktslvsltm
w-kmivgqaly--qliviftlhy-----
-gkda lxxxxxxx-----
ed---qlqtlvfniyvwmqffn-qhncrrvxxklniw--xx--gvxrnpxfigvqclt
fagqmiii--yk--ggq-----afqtvpl-----
-----dgpqwg--ws--mlfgiltiplg-----
-----vlirlt-----

-----pdryax-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
```

[illegible]

-----XXXXX

e

```
>celll_11B01 NP_501709.2
```

m-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XXX----

-----XXXXXXXX-----XXXXXXXX--XXX

tehegveglck-----

-----klk-----tds|vg|ngeq-----

-----xxldrrrhvygantippaksk-----

- g f v r | v l d a - c -----

-----kdptlvilvlsg--finla
lsfx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxse--ghgtawiegva
illc-v-----ivvvltavnd-----ys-----ke---rq
frslqexxet-----

-----gqk-fsv-----
----irn-----ge-aid-----v
p-----
----vsdLVGDIARVky-----
----GDLLPADGFLlqs-----

-----n--dlkIDESSLTGESDHlKKsi-

-xs-----
-----d-----PVLLS-GTYA-----
me--gsgk-----mLITAVGVNSQTGiimtllgax-----
-----xxxx-----xxxxxxx-----
-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxdltaksvlqaklsklalqiicycgttiaial
-ivlvtrfcxxxxxxxxxxx--x-----xxxxx-----mfvkffiaVTILVIS
IPEGLPLAiALALTYSVR-KMmhdn-----

-----nLVR-HLDACETMGNATSICSDKTG-----
-----TLTTNRMTVv-----qsy ingnhy-----

-----xxxxxxxhxxx
----lpgstgp-----
-----i l
meaisvnxxxxxmive-----
-----pxxxgxqi-----


```
fql-tvn-v-vavitaavgavtv-----d-splkavhmlwi
nlimdtlaslalteqpt-de-----lkerkpy-g-rkkslisrtm
v-knilchaly-qliiifviff-----
-ygdtix-xx-xxxxxxxxxxx-----
ps---qhftlvfnafvmmtvfn-einarkvxxernvf---x---glxsnrvfcviwvtt
fiaqiiiv-qf-gga-----wfstapl-----
-----tlqqwi---vc---lvlgfstliwg-----
-----qivati-----
-----
-----pskklx-----xxx-----
---xxxxxxxxx-----
-----
-----xxxxxxxxxxxxxxxxx-----xxxxxxxxxxxxxxxxx-----
-----xxxxxxxxx-----
-----
-----xxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxx
```

-----xxxxxx-----xxx-----

-----xxxxxxxx-----xxxxxxxx-----xxx
styngveg|cr-----

-----klk-----tdping|pndt-----

-----xx|ehrrtafgkneippapsk-----
-sf|rlawea-l-----
-----qdit|villvaa--lvs|g
lsfx-----xxxxxxxx-----xss--eseagwiegva
il|va-v-----lvvv|vtalnd-----wt-----ke--kq
frglqsxxet-----

-----ehk-fsv-----
-----irg-----ge-pld-----i
v-----
-----vneLVVGD|ARVky-----
-----GDLLPADGLL|qs-----

-----n--d|k|DESSLTGESDL|RKse--

-xf-----
-----d-----PVLLS--GTHA-----
me--gsgr-----flVTAVGLNSQTGi|msl|gaxx-----
-----xxxxxxxx-----xxxxxxxx
xx-xxxxxxxxxxxxxxxx--xxxxxxxx-grmsksvlqtkl|sn|alqigyigsivaaatv
-lil|irhcxxxxxxxxxxxx--x-----xxxxx-----hfvnfiiigVTVLVIA
VPEGLPLA|TLALTYSVK-KMm|kdn-----

-----nLVR-HLDACETMGNATSICSDKTG-----
-----TLTTNRMTCv-----qqyinsefy-----

-----xxxxxxe-x
-----mdpstrd-----
-----i l
fngivinxxxxtvvt-----
-----pxxxgxqr-----

-----gqignkte-csllgf---xx-x---
-----sgrsyed-lrrqxx-----

-----eeklykvytfnssrk-smmt-----

-----v-xxxx-xx-----xxxxxxk-----
-----gas
e-----iiltrcnyifgksgx-----

ieqfgpkeaavmxknviepm--asd---glrtlGLAFKdl-----x
xxxxxxxxxxxxxxxxdgeidwedeexiregqtvIAVMGIQDPVRPEVPAAIAKCQKag-ITV
RMVTGDNINTARSIAQCGL-----mqp-g-----

-----xxx---lalegkefnx-----
-----xxxx-----
xxx-----kvnqqkfda-----

iwpk|---rVLA---RAQPSDKYVLVKG|i-----
 ---esxxtk-----xxx-----VVAVTGDGTNDAPALKKADVGFAM---
 -----xiagtdv-----

```
-----pas | x-----xxx-----
-----xxxxxxxxxxxxx-----
```

```
-----XXXXXXXXXXXXXXXXXXXX-----XXXXXX-XXXXX-XXX
XXXXXXXXXX-----XXXXXXXXXXXX-----
-----XXXXXXXXXXXXXXXXXXXX-----XXXXXX
```

>hsa||_||B01 NP_001673.2

-----XXXXXXXXXXXX-XXXXXXXXXXXX-----XXX-----
-----XXXXXXXX-----XXXXXXXX-----XXX
esygdvygict-----
-----klk-----tspneglsnp-----
-----xxllerreavfgknfippkkpk-----
-tfllqlvwea-l-----qdvltliileiaa--ivslg
lsfx-----xxxxxxxxxxxxxxx-x-----xeg--egetgwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke----kq
frglqsxxeq-----
-----eqk-ftv-----
-----irg-----gq-viq-----i
p-----vadITVGDI AQVky-----
-----GDLLPADGILlqg-----

-----n--d|k|DESSLTGESDHVKKs|-----

$$-x_k$$

-----nLVR-HLDACETMGNATAICSDKTG-----

-----x-----x

-----rhvgnkte--ca||g|----xx-x----

-----v-xxxx--xx-----xxxxxxk-----

akvfrprdrddixktviepm--ase---glrtlCLAFRdf-----
-----xxxepepewdnenxivtgltcI AVVGIEDPVRPEVPDAIKKCQRag-ITV
RMVTGDNINTARAIA TKCGI-----lhp--g-----

-----xxx---lclegkdfnx-----
-----xxxx-----
xxx-----eieqer idk-----

iwpkl--rVLA--RSSPTDKHTLVKGIi-----
---dsxxsd-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDI ILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q
fqI-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtlaslalatפט-es-----lllrkpy--g-rnkplisrtm
m-knilghafy--qlvvvftllf-----
-agekfx-xx-xxxxxxxxxxx-----
ps---ehytivfntfvImqlfn-einarkixxernvf--x--gixnnaifctivlgt
fvvqiiiv--qf--ggk-----pfscsel-----
-----sieqwl---ws--iflmggtllwg-----
-----qlisti-----

-----ptsr lx-----xxx-----
---xxxxxxxxxxx-----

—cf|q|vwea—|-----

-----qdvtlvillvsa--ivsla
lsfx-----xxxxxxxxx-----xds--ehdagwiegva
ilis-v-----ivvvlvtaInd-----yt-----ke--rq
frglqaxxet-----

-----ehr-ffv-----
-----lrg-----gq--svq-----v
v-----
-----vneLVGDI AQIky-----
-----GDLIPSDGII lqs-----

-----n--dIkMDESSLTGESDQIRKsp-

-----x-----

--h-----
-----d-----PIILS--GTHV-----
me--gsgk-----mLVTA VGVNSQTGiimtllgaxxxxxx
-----xxxxxxxxxxxxxxxxxxxx
xx-xxxxxxxxxxxxxxxxxxxxxxxx-gkkersvlqakltrlaiqigyagsfvagctv
-lil iirfcxxxxxxxxx--x-----xxxxx-----hfinfliigVTVLVVA
VPEGLPLAvTSLAYSVK-KMmIdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qsfvndvhy-----

-----x-xxxxxe--x
-----ldqntak-----
-----Im
mdcisinxxxxxqvip-----
-----pxxxgxqa-----

-----AKEASDILTd-DNFTSIVkaVMWGRNVYDSIAKFL-----Q

m

-----XXXXXXXXXX-----XXXXXXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXX-----XXXXXXXXXX-----XXX-----
etygdteaicr-----

-----rlk-----tspveglpgta-----

-----xxlekrkqifgqnfippkkpk-----
-tflqlvwea-l-----
-----qdvltliileiaa--iislg
lsfx-----XXXXXXXXXXXXXXXXXXXXX-----xeg-----eaeagwiegaa
ills-v-----icvvlvtafnd-----ws-----ke-----kq
frglqsxxeq-----

-----eqk-ftv-----
-----vra-----gq-vvq-----i
p-----
-----vaeIVVGDI AQVky-----
-----GDLLPADGLFIqg-----

-----n-dlkIDESSLTGESDQVRKsv-----

-----xk-----
-----d-----PMLLS-GTHV-----
me-----gsgr-----mLVTA VGVNSQTGiiftllgaxxxx-xx
-----XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-xxxxxxx-hkkeksvlqgkltklavqigkaglvmsaitv
-iilvlyftXXXXXXXXXXXXXXXXXXXX-xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAVTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qayvgdvhy-----

-----x-xxxxxs-x
----intktme-----
-----||
inaiainxxxxkilp-----
-----pxxxgxlp-----

-----rqvgnkte-cgllgf---xx-x---
-----lkqdyep-vrsqxx-----

-----eeklykvytfnsvrk-smst-----

-----v-xxxx-xx---xxxxxxk-----
-----gas
e-----ivlkkockiIngagx-----

prvfrprdrdemxkkviepm--acd---glrtICVAYRdf-----
-----xxspepdwdnenxilineItcICVVGIEDPVRPEVPEAIRKCQRag-ITV
RMVTGDNINTARAIAIKCGI-----ihp--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----eieqeridk-----

iwpkl--rVLA--RSSPTDKHTLVKGLi-----
--dsxste-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd--DNFSSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatppt-et-----lllrkpy--g-rnkplisrtm
m-knilghavy--qlaliftllf-----
-vgekmx-xx-xxxxxxxxxxx-----
ps---ehytiifntfvmmqlfn-einarkixxernvf--x---gixrnpifctivlgt
faiqiviv--qf--ggk-----pfscspl-----
-----qldqwm--wc--ifiglgelvwg-----
-----qviati-----

-----ptsr lx-----xxx-----
--xxxxxxxxxxx-----

-----xxxxxx--xxxxxx-----xxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxx-----

-----xxxxxxx-xxxx-xxxx-----xxxxxx-xxxxxx-xxx
xxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxx-----xx---x-
----xxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxx-xxxx-x-----xxxxxxxx

|

>hsall_IIB03 NP_068768.2

m-----

-----XXXXXXXXXXXXXXXXXXXXXXX-----XXX-----
-----XXXXXXXXXXXXXXX-----XXXXXXXXXXXXXXX-----XXX-----
eaygdvsglcr-----
-----rIk-----tsptegladnt-----
-----xxlekrriygqnfippkqpk-----
-tflqlvwea-l-----qdvltliilevaa-ivslg
lsfx-----xxxxxxxxxxxxxxxxxxxxx-----xeg-----eaeagwiega
ills-v-----icvvlvtafnd-----ws-----ke-----kq
frglqsxxeq-----
-----eqk-ftv-----
-----irn-----gq-llq-----v
p-----
-----vaaLVVGDIAQVky-----
-----GDLLPADGVLlqa-----

-----n--dIkIDESSLTGESDHVRKsa-

-----x-----

--k-----
-----d-----PMLLS--GTHV-----
me---gsgr-----mVVTAVGVNSQTGiiftllgaxxx-xx
-----xxxxx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltklavqigkaglvmsaitv
-iilvlyfvxxxxxxxxxxxxxxxxxxxx-xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qsylgdthy-----

-----x-xxxxxs--x
-----ltpkiId-----
-----||
vhaisinxxxxxkilp-----
-----pxxxgxlp-----

-----rqvgnkte--callgf---xx-x-----
-----lkrdfqp--vreqxx-----

-----edklykvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----iIlkctniInsngx-----

lrgfrprdrddmxrkii epm--acd---glrtlClAYRdf-----
-----xxgqepdwdnenxvvgdl tclAVVGIEDPVRPEVPEAIRKCQRag-ITV
RMVTGDNINTARAIAAKCGI-----iqp--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----eieqerldk-----

vwpkl--rVLA--RSSPTDKHTLVKGIi-----
---dsxxge-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDI ILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q
fqI-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalat eppt-es-----lllrkpy--g-rdkplisrtm
m-knilghavy--qlaiiftllf-----
-vgelfx-xx-xxxxxxxxxxx-----
ps---ehytiifntfvmmqlfn-einarkixxernvf--x--gixsnpi fctivlgt
fgiqiviv--qf--ggk-----pfscspl-----
-----steqwl---wc--lfvgvgelvwg-----
-----qviati-----

-----ptsqIx-----xxx-----
---xxxxxxxxxxx-----

-----qdvltliileiaa--iisl
lsfx-----xxxxxxxxxxxxxxxx-----xen---eqagwiegaa
ilfs-v-----iivvlvtafnd-----ws-----ke---kq
frglqcxxeq-----

-----eqk-fsi-----
-----irn-----gq--liq-----l
p-----
----vaeIVVGDIAQVky-----
----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDHVKKsl-

-xk-----
-----d-----PMLLS-GTHV-----
me---gsgr-----mVVTAVGVNSQTGiiltllgvxxxx-xx
----xxxxx-----xxxx-xxxx-xxxxxxxxxx
xx-xxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltrlavqigkagllmsaltv
-fililyfvxxxxxxxxxxxxxxxx-----xxxxx-----yfvkffiiigITVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qayiggihy-----

-----x-xxxxxd--x
----flpkvld-----
-----li
vngisinxxxxxkilp-----
-----pxxxgxlp-----

fql-tvn-v-vavivaftgacitq-----d-splkavqmlwv
nlimdtfaslalatp-es-----llkrrpy-g-rnkplisrtm
m-knilghafy-qlivifilvf-----
-agekfx-xx-xxxxxxxxxxx-----
ps---qhytivntfvlmqifn-einsrkixxeknvf---x---gixrniifcsvglt
ficqifiv-ef-ggk-----pfsctsl-----
-----slsqwl---wc-lfigigellwg-----
-----qfisai-----

-----ptrslx-----xxx-----
-----xxxxxxxxx-----

-----xxxx-xxxxxxx-----xxxxxxxxxxxxxxxxx-----
-----xxxxxxxx-----

-----xxxxxxx-xxx-----xxxxxxx-xxx-----
-----xxxxxxx-x-----xxx-xxx-----xxxxxxx-----
-----xxxxxxxxxxxxxxxxx-----xxxxxxx-----xx-xxxxxx

-----XXXXXXXXXXXX-XXXXXXXXXXXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----XXX
esygdvygict-----

-----klk-----tspneglsnp-----

-----xxlerreavfgknfippkkpk-----
-tflqlvwea-l-----
-----qdvltliileiaa--ivslg
lsfx-----XXXXXXXXXXXXXXXXX-x-----xeg--egetgwiegaa
ills-v-----vcvvlvtafnd-----ws-----ke--kq
frglqsxxeq-----

-----eqk-ftv-----
-----irg-----gq-viq-----i
p-----
-----vadITVGDIAQVky-----
-----GDLLPADGILlqg-----

-----n--dlkIDESSLTGESDHVKKsl--

-----xk-----
-----d-----PLLLS--GTHV-----
me--gsgr-----mVVTAVGVNSQTGiiftllgaxxxx-xx
XXXXXXXXXX-----XXXXXXXXXX-XXXXXXXXXX
xx-XXXXXXXXXXXXXXXXXXXXXXXXX-pkkeksvlqgkltklavqigkagllmsaitv
-iilvlyfvXXXXXXXXXXXXXXXXX-----xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTMNRMTVv-----qayinekhy-----

-----x-xxxxxe-x
-----ippni ls-----
-----y l
vtgisvnxxxxxki lp-----
-----pxxxgxlp-----

-----rhvgnkte-callgf---xx-x---
-----lkrdyqd-vrnexx-----

-----eealykvytfnsvrk-smst-----

-----v-xxxx-xx---xxxxxxk-----
-----gas
e-----iilkckfkilsangx-----

akvfrprdrddixktviepm--ase---glrtICLAFRdf-----
-----xxepepewdnenxvvtgltcIAVVGIEDPVRPEVPEAIKKCQRag-ITV
RMVTGDNINTARAIAKCGI-----lhp-g-----

-----xxx---lclegkdfnx-----
-----xxxx-----
xxx-----eieqeridk-----

iwpk l--rVLA--RSSPTDKHTLVKGI i-----
--dsxxse-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

```

-----AKEASDIILTd-DNFTSIVKaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d-splkavqmlwv
nlimdtlaslalatppte-es-----lllrkpy--g-rnkplisrtm
m-kni lghafy--qlvvvftllf-----
-agekfx-xx-xxxxxxxxxxx-----
ps---ehytivfntfvlmqlfn-einarkixxernvf--x---gixnnaifctivlgt
fvvqi iiv-qf--ggk-----pfscsel-----
-----sieqwl---ws--iflmggtllwg-----
-----qlisti-----

```

```
-----ptsr | x-----xxx-----
-----xxxxxxxxxxxx-----
```

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-----XXXXXXXX-XXXXXXXX-----XXXXXXXXXXXXXXXXXX-----
-----XXXXXXXXXX-----
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-----XXXXXXXXXXXXXXXXXXXX-----XXXXXX-----XXXXX-----
-----XXX-----XXXX-----X-----
-----XXXXXX-----XXX-----XXXXXX-----XX-----XXXXXX

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S

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>rnoII_IIB03 XP_343840.2
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m _____

-----XXXXXXXXXXXXXXXXXXXXXXX-----XXX-----
-----XXXXXXXXXXXXXXX-----XXXXXXXXXXXXXXX-----XXX
eaygdvsglcr-----
-----rIk-----tsptegladnt-----
-----xxlekrrqi ygqnfippkqpk-----
-tflqlvwea-l-----qdvltliilevaa--ivslg
lsfx-----xxxxxxxxxxxxxxxxxxxxx-----xeg-----eaeagwiega
ills-v-----icvvlvtafnd-----ws-----ke-----kq
frglqsxxeq-----
-----eqk-ftv-----
-----irn-----gq-llq-----v
p-----
-----vaaLVVGDI AQVky-----
-----GDLLPADGVL lqg-----

-----n--dIkIDESSLTGESDHVRKsa-

-----x-----

--k-----
-----d-----PMLLS--GTHV-----
me---gsgr-----mVVTAVGVNSQTGiiftllgaxxx-xx
-----xxxxx-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-pkkeksvlqgkltklavqigkaglvmsaitv
-iilvlyfvxxxxxxxxxxxxxxxxxxxx-xxxxx-----yfvkffiiigVTVLVVA
VPEGLPLAvTISLAYSVK-KMmkdn-----

-----nLVR-HLDACETMGNATAICSDKTG-----
-----TLTTNRMTVv-----qsylgdthy-----

-----x-xxxxxs--x
-----ltpkiid-----
-----||
vhaisinxxxxxkilp-----
-----pxxxgxlp-----

-----rqvgnkte--callgf---xx-x-----
-----lkrdfqp--vreqxx-----

-----edqlykvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----iIlkctniInsngx-----

lrgfrprdrddmxkkiiepm--acd---glrtlCIAyRdf-----
-----xxiqepdwdnenxvvgdltcIAVVGIEDPVRPEVPEAIRKCQRag-ITV
RMVTGDNINTARAIAAKCGI-----iqp--g-----

-----xxx---lclegkefnx-----
-----xxxx-----
xxx-----eieqerldk-----

vwpkl--rVLA--RSSPTDKHTLVKGIi-----
---dsxxge-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q
fql-tvn-v-vavivaftgacitq-----d--splkavqmlwv
nlimdtfaslalatppte-es-----lllrkpy--g-rdkplisrtm
m-knilghavy--qltiiftllf-----
-vgelfx-xx-xxxxxxxxxxx-----
ps---ehytiifntfvmmqlfn-einarkixxernvf--x--gixsnpifctivlgt
fgiqiviv--qf--gdk-----pfscspl-----
-----steqwl---wc--lfvgvgelvwg-----
-----qviati-----

-----ptsq|x-----xxx-----
---xxxxxxxxxxx-----

[illegible]

-----rqvgnkte--cgllgf---xx-x---
-----lkqdyqa--vrsexx-----

-----eeklfkvytfnsvrk-smst-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----imlrkodriInkegx-----

ivpfktdrdrnmxrniepm--ase---glrtlGIAyRdf-----
-----xgeepswenenxiftglvcIAVVGIEDPVRPEVPDAINKCKRag-ITV
RMVTGDNVNTARAIAKCGI-----ltp--g-----

-----xxx---lclegkefnx-----
-----xxx-----
xxx-----eveqekldk-----

vwprl--rVLA--RSSPTDKHTLVKGIi-----
---dsxxge-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFTSIVkaVMWGRNVYDSISKFL-----Q

```
fql-tvn-v-vavivafsgacitq-----d-splkavqmlwv
nlimdtfaslalatppt-ds-----llrrpy--g-rnkplisrtm
m-kni lghavy--qlgivfllvf-----
-agdklx-xx-xxxxxxxxxxx-----
ps---qhytivntfvlmqlfn-einsrkixxeknvf--x---gvxrni ifcsvlgt
ffcqv-----
```

S

-----XXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

[illegible]

-----aLVR-HLSACETMGSASCICTDKTG-----
-----TLTTNHMVVe-----kiwasgaa-----
-----x-xxxxxxkxxx-----
xxxxxmsetfak-----v|
|egvfhc--xxsevv-----
-----rxxxg-rh-----
-----timgtpte--tailef--xx-x-----
-----vekrari--eht-----
-----gagklkvepfnsvkk-tmav-----
-----v-xxxxxxxx--xxxxxxk-----gas
e-----vvlsrcslvldgtgx-----
vekltdakakrv-asaidaf--ace--alrtLCLAYQdv-----
-----dggggdpxpgegyt|IAVFGIKDPLRPGVREAVATCHAag-INV
RMVTGDNINTAKA|ARECGI-----ltd-d-----
-----x-----iaiegpefr-----
-----nkdpdamre-----

i i p k i — q V M A — R S L P L D K H T L V T N L r —
 — g m — x n e — — — — — V V A V T G D G T N D A P A L H E A D I G L A M —
 — — — — — x i a g t e v — — — — —

-----AKENADVIMd-DNFSTIIInvAKWGRSVYINIQKFV-----Q
fql-tvn-v-valmvnfisasftg-----s--apltivqllwv
nlimdtlgalaateppn-da-----mmkrppv--g-rgdhfitkvm
w-rnivgqsiy--qlvvlgvlll-----
-rgkslx-xx-----xxx--xx-----
ds----lIntfvntfvfcqvfn-evnsremx-kinvf--x--gixsswifsavvgvt
agfqvimv--el--lgt-----fantvhl-----
-----sgklwl----ts--vligsvglvig-----
-----ailkci-----

-----pvesgx-----xxx-----

-----XXXXXXXXXX-----

-----XXX-----XXX-----

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>osall_||B02 NP_001046064.1
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m-----

-----XXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----XXXXXXXXXX
XXXXX-----XXXXXXXXXXXXXXXXXX-----XXXXXXXXXXXXXXXXXXXXX-----X
XXXXXXXXXXXXXXXXXXXXX-----

-----vkg|an-----
-----llk-----tntekgvhgde-----

-----xx|acranafganryprkkgr-----
-sflvflwea-c-----
-----qdltlviliiaa--vislv
lgi-----xte--gikegwydgas
iafa-v-----flvilvtavsd-----yk-----qs----lq
fqhlnex-kq-----

-----niq-vev-----
-----irg-----gr--rie-----v
s-----
----ifdIVVGDVVALki-----
----GDQVPADGVLVsg-----

-----h--s|a|DESSMTGESK|VVKdh-

---k-----

-----dnneetplqvr lngvatfigivglsvaamvl

-----aLVR-RLSACETMGsATTICSDKTG-----

-----k-xx

-----exxxgxp-----

-----eitgspte--kai|sw---xx-x---

-----kss i hv spfnsekk-ragv-----

$$-a-xxx-xxx-xxxk-----$$

e-----iv|a|ctnwl|dvngx-----

shemtpdkanqf-kkyieem--aee---slrcVAFAYRnl-----
-----xxxxxpneeerinwexpdnelalIGIVGMKDPCRPGVRNAVDLCKNag-VKV
RMVTGDNLQTARAIALECGI-----lt--d-----

-----xxxxxxviegkvfr-----
-----aysdaerea-----

vadqi--sVMG--RSSPSDKLLLVKAlk-----
--kk--gn-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiqgtev-----

-----AKESSDIIILd-DNFASVvkVRWGRSVYANIQKFI-----Q
fqI-tvn-v-aaliiinvvaaissg-----n--vpInavqllwv
nlimdtlgalaateppt-dq-----lmkrppv--g-rkeplvtnim
w-rnlfiqavf--qvtvlltlnf-----
-rgrdlx-----
hl---tqdtldhan---kvfn-efnsrkpx-elNif--x--gvxrnhlflavvsit
vvlqviii--ef--lgk-----ftstvrI-----
-----swklwl---vs--vgigfvswpla-----
-----fagkfi-----

-----pvprtx-----xxx-----

XXXXXXXXXX

XXXXXXXXXX

XXXXXX

[illegible]

kshggveiaa-----

```
-----xxqavree|fginrfaetesr-----
-sfwvfvwea-|-----
```

-----qdm t l m i l a a c a--f f s l v
v g i-----x t e--g w p k g a h d g l g
i v a s-i-----l l v v f v t a t s d-----y r-----q s----l q
f k d l d k x-k k-----

-----k i t-v q v-----
-----s r n-----g y--r q k-----l
s-----
-----i y d L L A G D I V H L s i-----
-----G D Q V P A D G L F L s g-----

-----f--s l l I N E S S L T G E S E P V A V n a-

-----e-----
-----n-----P F L L S--G T K V-----
q d--g s c k-----m L V T T V G M R T Q W G k l m a t l s e-----

-----g g d d e t p l q v k l n g v a t i i g k i g l i f a v v t f
-a v l t e g l f x x x-x x x x x x x x x x x x-----x x x-----e l l e f f a i a V T I V V V A
V P E G L P L A v T L S L A F A M K-K M m n d k-----

-----a L V R-H L A A C E T M G S A T T I C S D K T G-----
-----T L T T N H M T V v-----k a c i c g k i-----

-----x-x x x x x s x x x
x x x x x l p e s a m t-----
-----| |
s q s i f n n--x x g d v v-----
-----f x x x g-s r-----

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
tvhgqlngiad-----

-----klg-----tsltngivtdk-----

-----xxlnqrqdiygvnkfaeteir-----
-sfwefvwea-l-----
-----edttliilsaca--ifslv
vgi-----xte--gwpqgahdvg
ivas-i-----llvsvtgtsn-----yq-----qs----lq
frldkx-kr-----

-----kil-vqv-----
-----trn-----gl--rqr-----v
l-----
----iddLLPGDAVHLav-----
----GDQVPADGLFIs-----

-----f--svlVDESSLTGESEPVFVne-----

-----d-----
-----n-----PYLLS--GTKV-----
ld--gsck-----mLVTAVGMRTQWGklmavld-----

-----ggddepqtrlngvantigkiglffavltf
-ivlsqgiixx-xxxxxxxxxxxxx-----xxx-----eildhfavaVTIVVVA
VPEGLPLAvTLSLAFAMK-KMmdk-----

-----aLVR-QLAACETMGSATVICSDDTKG-----
-----TLTTNRMTVv-----kac icgnt-----

-----x-xxxxxq-xx
xxxxxfpevave-----
-----t l
lesi fnn--xxgevv-----
-----txxxg-ky-----

-----qilgtpte--tal lef----xx-x-----
-----ldgdcke--kql-----

-----gskivkvepfnstkk-rmst-----

-----i-xxxx--xx----xxxxxxk-----
-----gas
e-----ivlaacdkfidergx-----

ivplddktsskl-ndi ikaf--sse----alrtLCLAYRem-----
-----eegfstqeqi-plqgytcIGIVGIKDPVRPGVRQSVATCRSag-ISV
RMITGDNIDTAKAIARECGI-----ltk--d-----

-----x-----iaiegaefr-----

-----eksaeelhd-----

l i p k m — q V L A — R S S P L D K H T L V K H L r —
 — — t a — x n e — — — — — V V A V T G D G T N D A P A L R E A D I G L A M —
 — — — — — x i a g t e v — — — — —

-----AKESADVILd-DNFSTIVtvAKWGRSVYVNIQKFV-----Q
fql-tvn-v-vallvnftsacftg-----d-apltavqllwv
nmimdtlgalaateppn-nn-----lmkkapv---g-rkgkfitnm
w-rnivgqsl-y-qfavmwylqt-----
-gqkhlx-xx-----xxx---xx-----
di----vIntiifntfvfcqvfn-eissremx-dinvl---x---gmxgnsiflgvltgt
iffqfilv-qf---lgd-----fanttpI-----
-----tqqqwl----is--ilfgflgmpia-----
-----aaikli-----

-----avephx-----xxx-----

-----XX-----

-----XXX-----

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>osall_||B05 NP_001053795.1
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m-----

[illegible]

khsmtp ek isef-kkfiedm-aas-slr cVAFAYRty
-----xxxxxpsedrradwixpeddlimLGIVGIDPCRPGVKDSVRLCAAag-IKV
RMVTGDNLQTARAI ALECGI-----Is--d-----

-----xxxxxxv iiegkafr-----
-----alsdleree-----

aaeki-sVMG-RSSPNDKLLL VKALr-----
--kr-gh-----VVAVTGDGTNDAPALHEADIGLSM--
-----xiqgtev-----

-----AKESSDIIILd-DNFASVrvVRWGRSVYANIQKFI-----Q
fqI-tvn-v-aaliinvvaavssg-----n--vpInavqllwv
nlimdtlg alatep pt-dh-----lmqrppv--g-rrepl itnvm
w-rnliimalf-qvivlItInf-----
-rgtslx-xx-----xxxxxxx-----
dk---vkntfifntfvlcqvfn-efnarkpx-el nif---x---gixgnhlfmaivait
vvlqaliv--ef--lgk-----ftsttrI-----
-----twqlwl-----vs--igla ffs wpl a-----
-----fvgkli-----

-----pvperx-----xxx-----

XXXXXXXXXX

XXXXXXXXXX

XXXXXX

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-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXX-----XXXXXXXXXXXXX-----XXX-----
```

rmhggingisr-----

```
-----iatrqmlyganrhaekppr-----
-sfwmfvwdal-----
```


-----hdtliilvca--lvsiv
vgl-----xTk--gwpmgidydgfg
iils-i-----llvvltatsd-----yq-----qa----rk
fmeldrx-kq-----

-----kiy-irv-----
----trd-----kk--tke-----v
l-----
----vhdLVGDIHLsi-----
----GDVVPADGLFIs-----

-----d--clmIDESSLGSEPVNIs--

-xe-----
-----r-----PFLHA--GNKV-----
vd--gaak-----mLVTAVGTRTEWGkimgtIng-----

-----dgvdetplqvklngvatiigqiglvfavltf
-lvllarflxxx-xxxxxxxxxxxxx-----xxx-----tivnyfaiaVTIIIVA
VPEGLPLAvTLSLAFAMK-KLmhdK-----

-----aLVR-HLAACETMGsASCICTDKTG-----
-----TLTTNHMIVd-----kvwigd-v-----

-----xxxxkxxx
xxxxxiservma-----
-----iI
iqgifvn--xxsevv-----
-----kxxxg-kn-----

-----tilgate--tal lef---xx-x-----

-----leeh|yd--dyn-----

-----kltr ikvdpfnsvkk-kmsv-----

-t-xxxx-xx---xxxxxxk-----

-----gas

e-----i i l e q n t i h n t d g x-----

ivplsemqkhnv-Iniinsf--ase---alrtLCIAFKdm-----

-----defpndqpxsddgyt|IAVFGIKDPVRPGVKDAVRTCMAag-IRV

RMVTGDNINTAKAIAKECGI-----l t e - d -----

-----x-----iaiegqqln-----

-----nkssdelke-----

Ilpki--qVIA--RSLPMDKYKLVTSK-----

---sm-xqe-----VVAVTGDGTNDAPALHESD | GLAM---

-----xitgtev-----

-----AKESADV I I Md-DNFET I VnvARWGRAVYLN I QKFV-----Q

XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

-----XXXXXXXX-----XXXXXXXX-----

knhggvdgisk-----

-----kvr-----ssfdhgicasd-----

-----ldtrqniygvnryaekpsr-----

-sfwmfvwda-f-----

-----qdmtl iilmvca--llsva

vgl-----xte---gwpkgmydglg

iils-i-----flvvmvtavsd-----yk-----qs----lq

fkel dnx-kk-----

-----kif-ihv-----

-----trd-----gr---rqk-----i

s-----

---iydLVVGDIVHLsi---

---GDQVPADGLYlhg---

y-s|||DESSLGSEDPVVVs-

x-d-

-----k-----PFILA-GTKV-----

qd---gsak-----m lVTAVGMRT EWGkl mstlse-----

-----ggedetplqvklngvatvigkiglvfailtf

-lvlrvrfxxx-xxxxxxxxxxxxxx-----xxx-----tivnyfataVTII VVA

VPEGLPLAvTLSLAFAMK-KLmdnk-----

-----aLVR-HLSACETMGSAGTICTDKTG-----
-----TLTTNYMVVd-----kiwisevsk-----

-----xxxxxtxxx
xxxxxvssrtls-----
-----||
lqgifen---xxaevv-----
-----kxxg-kq-----

-----tvlgtp-te-railef---xx-x---
-----legvhda-ey-----

-----actkvkvepfnsvkk-kmav-----

-l-xxxx-xx---xxxxxxk-----
-----gas
e-----iilqmcmmvvdgdgx-----

aipleaqrkni-l-dtinsf--asd---alrtLCLAYKev-----
-----dddidnadxptsgftIIAIFGIKDPVRPGVKDAVKTCSag-ITV
RMVTGDNINTAKAIAKECGI-----lte-d-----

-----x---vaiegpefh-----

-----skspeemrd-----

lipni--qVMA--RSLPLDKHTLVTNLr-----
--gm-xde-----VSVTDGDTNDAPALHEADIGLAM--
-----xiagtev-----
-----AKESADVIVLd-DNFTTIIInvARWGRAVYINIQKFV-----Q
fql-tvn-i-valvinfsacitg-----s--apltavqllwv
nmimdtlgalaateppn-de-----mmkrppv--r-kgesfitkvm
w-rnimgqsly--qlfvlgalmf-----
-ggeslx-xx-----xxx--xx-----
ks----iintlifnsfvfcqvfn-einsremx-kinvf--x--gixsnwifiaviaat
vafqvvi--ef--lgt-----fastvpl-----
-----nwqhwI----ls--vglgsislivg-----
-----vilkci-----

-----pvgsgx-----xx-----

-----XXXXXXXXXX-----
-----xxx--xxx-----

>osall_IIB09 NP_001066105.1

m-----

-----XXXXXXXXXX--XX-XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXX-----XXX-----

-----XXXXXXXXXX-----XXXXXXXXXX-----
kmhggvdgisi-----

-----kvr-----ssfdhgiyase-----

-----ldtrqniygvnryaekpsr-----
-sfwmfvwda-l-----

-----qdmtliilmvca---llsva
vgl-----xte---gwpkgmydglg
iils-i-----flvvmvtavsd-----yk-----qs----lq
fkeldnx-kk-----

-----kif-ihv-----
-----trd-----gr-rqk-----i
s-----
iydLVVGDIVHLsi-----
GDQVPADGLYlhg-----

aiplseaqrkni-l dtinsf--asd---alrtLCLAYKev-----
-----ddididnadxptsgftlIAIFGIKDPVRPGVKDAVKTCSag-ITV
RMVTGDNINTAKAIAKECGI-----lte--d-----

-----x-----vaiegpefh-----
-----sksteemrd-----

liilni--qVMA--RSLPLDKHTLVTNLr-----
--gm-xde-----VSVTGDGTNDAPALHEADIGLAM--
-----xiagtev-----

-----AKESADVIVLd-DNFTTIIInvARWGRAVYINIQKFV-----Q
fql-tvn-i-valvinfsaciig-----s--apltavqllwv
nmimdtlgalaateppn-de-----mmkrppv--r-kgesfitkfm
w-rnimgqsly--qlfvlgalmf-----
-ggerlx-xx-----xxx--xx-----
ks---iintlifnsfvfcqvfn-einsremx-kinvf--x--gixsnwifiaviaat
vafqvvi--ef--lgt-----fastvpl-----
-----nwqhwI---ls--vglsgislivg-----
-----vilkci-----

-----pvsgsx-----xx-----

XXXXXXXXXX

-----XXX-----XXX-----

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>dmeII_II B01 NP_726564.3
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m-----

-----XXXXXXXXXX-----XXX-----

-----XXXXXXXXX-----XXXXXXXXX---XXX

aenggi helck-----

-----kly-----tspneglsgsk-----

-----xxeehrrretfgsnvipppkpk-----

-tf|t|vw ea|-----

[illegible]

-----iqvgnkte--callgf---xx-x---
-----lgvkyqs--irdexx-----

-----edkftrvytfnsvrk-smgt-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----iimkkcafiyghegx-----

lekftrdmqerlxreviepm--acd---glrtISVAYRdf-----
-xxxxxxxxxxxxdgepnwddeeximtnltcLCVVGIEDPVRPEVPDAIRKCQRag-ITV
RMVTGDNINTARSIAKCGI-----lrp--n-----

-----xxx---lilegkefnx-----
-----xxx-----
xxx-----diqqhlidk-----

vwpkI--rVLA--RSSPTDKYTLVKGIi-----
---dsxxse-----xxx-----VVAVTGDGTNDGPALKKADVGFAM--
-----xiagtdv-----

-----AKEASDIILTd-DNFSSIVkaVMWGRNVYDSIAKFL-----Q

XXX-----XXX-----

-----XXXXXXXX-----XXXXXXXX-----
ithggvtgiad-----

-----kla-----tspadglstae-----

-----xxikrrqdvylnkftesevr-----
-sfwvfwea-l-----
-----qdtllilavca--fvslv
vgi-----xme--gwpkgahdglg
ivas-i-----llvvfvatds-----yr-----qs----lq
fkldkx-kk-----

-----kiq-vqv-----
-----trn-----gf--rqr-----l
s-----
----iydLLPGDVVHLai-----
----GDQVPADGLFIs-----

-----f--sllINESSLTGESEPVVVne-----

--d-----
-----n-----PFLLS--GTKV-----
qd--gsck-----mLITTVGMRTQWGklmatlse-----

-----ggddepqvkIngvatiigkigIffavitf
-ivlsqglixxx-XXXXXXXXXXXXX-----xxx-----emlehfaiaVTIVVVA
VPEGLPLAvTLSLAFAMK-KMmdk-----

-----aLVR-HLAACETMGSATTICSDKTG-----
-----TLTTNHMTVv-----kac icgni-----

-----x-xxxxxkxxx
xxxxxlpetvvk-----
-----tl
lesi fnn--xxgevv-----
-----ixxxg-ky-----

-----qilgtpte--tallef---xx-x---
-----lggnfka--krd-----

-----etkivkmepfnstkk-rmcv-----

-----v-xxxx--xx---xxxxxxk-----
-----gas
e-----ivlaacdkfmdetgx-----

vvpldkttadkl-ngiiesf--ane---alrtLCLGYRem-----
-----eegfsveeqi-plqgytcIGIVGIKDPVRPGVRESVATCRSag-IMV
RMVTGDNINTAKAIARECGI-----lte--d-----

-----x-----laiegpefr-----

-----eksldellk-----

lipki--qVMA--RSSPLDKHTLVKHLr-----
--tt-xne-----VVAVTGDGTNDAPALHEADIGLAM--
-----xiagtev-----
-----AKESADVILd-DNFSTIVtvAKWGRSVYVNIQKFV-----Q
fql-tvn-v-vallvnfssacftg-----n--apltavqllwv
nmimdtlgalaateppn-dd-----lmkrepv--g-rtgkfitnvm
w-rnilgqsfy--qfivmwylqt-----
-qgksmx-xx-----xxx--xx-----
ev---vIntiifnsfvfcqvfn-eissremx-kinvl--x--gixknyvflgvlst
vvfqfimv--qf--lge-----fantipl-----
-----trlqwi--as--vllgligmpis-----
-----aiikll-----

-----pvgss-----

-
>rnoII_IIC01 NP_036637.1

m-----

-----XXXXXXXXXXXXXXXXXXXXX-----XX-----
-----XXXXXXXXXXXXXXXXXXXXX-----
dhklsldelgr-----
-----kyq-----vdl skgltnqr-----
-----aqdi lardgpnaltppptt-----
-pewvkfcrq-l-----
-----fggfsillwiga--llcfl
aygx-----xxxxxde--psndhlylgiv
laav-v-----ivtgcfsyyqe-----ak-----ss--ki
mdsfkn--mv-----
-----pqq-alv-----
-----ire-----ge--kmq-----i
n-----
-----aeeVVVGDLVEVkg-----
-----GDRVPADLRlIss-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NICFF--STNC-----
ve--g-----IVIATGDRTVMGriatlasg-----

-----levgqtpiameiehfiqlitgvavflgvsff
-vlsilgy-----swleaviflIGLIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdkrsptwx-----
-----aI
sriaglc---nraV-----
-----f--kxgqxxxxxxxx-

-----dtagdase--salIk-----
-----ielscgs--vrkmxx-----

-----rnpkvaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxx-----
-m-----k-----
-----gap
e-----rildrcstilvgk-----

eipldkemqdaf-qnayme|---ggl---gervLGFCQLn|-----
-----xxxxxxxgfkfdtdelnxptek|cfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxx-----xxxcvvhgsdlk-----

-----dmtseq|de-----

ilrdhxxiVFA--RTSPQQLIIVEGCq-----
---rq--ga-----IVAVTGDGVNDSPALKKADIGIAM--
-----xisgsdv-----

-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKS|-----A
ytl-tsn-i-peitpfl|fii ani-----p--lplgtvtilci
dlgtdmvpaislayeaae-sd-----imkrqpr--nxqtdklvnerl
ixmaygqigmi--qalggfftyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqrkvx-----
ef---tchtaffasivvvqwad-liicktrxxsvfqq-----gm-knkilifgllee
talaaf|s--ycxxmgv-----alrmypl-----
-----kvtwwf---ca--fpysllifiyd-----
-----evrkli-----

-----lrrypx-----xxxxxxx-----

y

>rnoII_IIC02 NP_036638.1

m

x

XXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXX

ehkmsveevcr

kyn

tdcvqglthsk

aqei lardgpna ltpptt

-pewvkfcrq-l

-----fggfsillwiga--ilcfl
aygx-----xxxxdd--psgdnllylgiv
laav-v-----iitgcfsyyqe-----ak-----ss--ki
mesfkn--mv-----

-----pqq-alv-----
----ire-----ge--kmq-----v
n-----
---aeeVVVGDLVEIkg-----
---GDRVPADLRlIsa-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NITFF--STNC-----
ve--gtar-----gVVVATGDRTVMGriatlasg-----

-----levgktpiaieiehfiqlitgvavflgvsff
-ilslilgy-----twleaviflIGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdksshtwx-----
-----al
shiaglc---nraV-----
-----f--kxgqxxxxxxxxx-----

dvagdase-sallkc
ielssgs-vklmxx
rnkkvaeipfnstnkxqlsi
xxxxxxx-xxxxxxx
m-k
gap
e-rildrcatillgk
eqpldeemkeaf-qnaylel-ggl-gervLGFCHYyl
xxxxxxxgfafdcddvnxttndlcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-isexxe
xxxxxx
x-x-xxxxxxx-xxxx-xxxcvihgtdlk
dftseqide
ilqnhxxiVFA-RTSPQQKLIVEGCq
rq-ga-IVAVTGDGVNDSPALKKADIGVAM
xiagsdv
SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKSIA

```
-----|rrnpx-----xxxxxxxx-----
```

A handwriting practice sheet for the letter 'm'. It features a large 'm' at the top left, followed by a series of horizontal dashed lines for tracing and writing practice. The lines are evenly spaced and extend across the width of the page.

XXXXXXXXXXXXXXXXXXXXXXXXXXXX-XX

-----XXXXXXXXXXXXXXXXXXXX

dhkltldelsa

kysvdltk

qqalv

irdgekmqi

n

vrdVVLGDLVEVkg

GDQVPADIRVIaa

qgckVDNSSLTGESEPQSRcp

xxxxxxx

xxt

rNI IFFSTNC

vegтаргVVIATGDHTVMGrasltsg

lmtgktpiateiehfihiitavavflgtff

-flslilgytwldavifllGIIVAN

VPEGLLATvTVCLTLTAK-RMarkn

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hlwfdktvy-----

-----xxxxx-exxx
xxxxpkssdtwx-----
-----yl
ariaglc-----nrad-----
-----f-kxhqxxxxxxxx-----

-----tttgdase-sal lkf-----
-----ieqsysp-vsemxx-----

-----knpkvaeipfnstnkxqms i-----

-----xxxxxx-----xxxxxx-----
-m-----k-----
-----gap
e-----ri ldfcssfllngq-----

eypmdeemktdf-qnayiel--ggl-----gervLGFCFLnl-----
-----xxxxxxgfgfntee lnxpmenlcfAGLISMIDPPRTAVPDAVSKCRSag-IKV
IMVTGDHPITAKAIAKSVG I-----i sexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxxx-----xxxi vvhgse lk-----

-----dmdsgql dn-----

i l k s y x x i V F A — R T S P Q Q K L I I V E G C q —
 — r l — g a ————— I V A V T G D G V N D S P A L K K A D I G I A M —
 ————— x i t g s d v —————

-----irrrpx-----xxxxxxxx-----

-----XXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXXXXX

dhr lsnte leq-----

-----kyg-----tni i qglssvr-----

-----atellardgpntltppkqt-----

-pei ikflkq-m-----vggfsillwiga--alcwi

afvx-----xxxxxs-----asldhnylga i

lvlv-v-----iltgifayyqe-----ak-----st-----ni

masf sk--mi-----

-----pqq-alv-----

-----ird-----ae-kkv-----i

s-----

-----aeqLVVGDVVEIkg-----

-----GDQIPADIRLVfs-----

-----xx-----ckVDNSSLTGESEPQARst-----

-----xxxxxxx
xxt-----
-----k-----NIGFY-STTC-----
le---gtat-----gIVINTGDRTII Gri as lasg-----

-----vgsekt piaieiehfvhivagvavsigiiff
-itavcmky-----yvldaiifIIISIIVAN
VPEGLLATvTVTLSLTAK-RMakkn-----

-----cLVK-NLEAVETLGSTSIICSDKTG-----
-----TLTQNRMTVa-----hlwfdnqif-----

-----xxxxx---exx---
xxxxxdqssgtwx-----
-----sI
skiitlc---nrae-----
-----f---rxgqxxxxxxxx-----

-----tvvgdase---tal lkf-----
-----sevilgd---vmgi xx-----

-----rnhkvaepfnstnkxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rilekcostimingq-----

eqpldkssadsf-htayme|---ggl---gervLGFCHLy|-----
-----xxxxxxxsyifdvdsvnxptsnfcfVGLLSMIDPPRSTVPDAVSKCRSag-IKV
IMVTGDHPITAKAIAKSVG|-----isaxxe-----

-----xxxxxx
x--x-----xxxxxxx---xxxx-----xxxavvtgmelk-----

-----dmtpeqlde-----

lltnyxxiVFA--RTSPQQKLIIVEGCq-----
---rq--da-----IVAVTGDGVNDSPALKKADIGIAM--
-----xiagsda-----

-----AKNAADMVLLd-DNFASIVtgVEEGRLIFDNLKKTl-----A
ytl-tnk-i-aelcpfliyivagl-----p--lpigtitilfi
dlgt diipsialayekae-sd-----imnrkpr---hxkkdrlvntql
axysylhiglm--qalggflvyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xyqrkyx-----
ew---tgstaffvaimiqqiad-liirktrxxsifqq-----glxrnkviwvgiasq
vivalils--ygxxsvp-----alsftml-----
-----rvqywf---va--vphailiwyd-----
-----emrklf-----

-----irlypx-----xxxxxxx-----

y

>rnoII_IIC05 XP_341835.2

m

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XX-----

-----XXXXXXXXXXXXXXXXXXXX

dhq|svse|eq

-----kyq-----tsatkg|kas|-----

-----aaelllrdgpna|rprrgt-----

-peyv|kfarq|-|

-----agglqclmwvaa--aicli
afax-----xxxxdl---ttddnlylala
liav-v-----vvtgcfgyyqe-----fk-----st---ni
iasfkn--lv-----

-----pqq-atv-----
-----ird-----gd-kfq-----i
n-----
-----adqLVGDLVEMkg-----
-----GDRVPADIRILsa-----

-----q--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STMC-----
le---gtaq-----gLVVSTGDRTIIGriaslasg-----

-----venektpiaieiehfvdiiaglaifgatff
-vvamcigy-----tflramvffMAIVVAY
VPEGLLATvTVCLSLTAK-RLaskn-----

-----cVVK-NLEAVETLGSTSVICSDKTG-----
-----TLTQNRMTVs-----hlwfdnhih-----

-----xxxxx--exx-
xxxxxdqssetwx-----
-----aI
crvltlc---nraa-----
-----f---kxgqxxxxxxxx-----

-----ivigdase--tal l kf-----
-----sel t l gn--amgyxx-----

-----rfpkvceipfnstnkxql si-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rvlercssil i kgq-----

elpldeqwreaf-qtayl si--ggl-----gervLGFCQLyl-----
-----xxxxxxxgytfdveamnxpssglcfAGLVSMIDPPRATVPDAVLKCRTag-IRV
IMVTGDHPITAKAIAASVGI-----i sexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxxx-----xxxcv ingmq l k-----

-----dmdpse l ve-----

alrthxxmVFA--RTSPQQKLVI VESCq-----
---r l--ga-----IVAVTGDGVNDSPALKKADIGVAM--
-----xiagsda-----

-----AKNAADMILLd-DNFASIVtgVEQGRLIFDNLKKS l-----A

ytl-tnk-i-peltpylitytvsv-----p--lplgcitilfi
elctdifpsvslayekae-sd-----imhlrpr--nxrrdrlnep
axysyfqigai--qsfgafadyfxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xgqrlx-----
qy---tcytvffisiemcqiad-vlirktrxxsafqq-----gfxnrnilviaivf
vcigcflc--ycxxmpn-----ifnfmpi-----
-----rfqwwl---vp--mpfgllifvyd-----
-----eirklg-----

y

-----XX-----XX-----

-----XXXXXXXXXXXXXXXXXXXX
fhk i spee l yq-----

-----rfq-----thpeng l shak-----

-----aken l erdgpnal tppkqt-----
-pewvkfckn-l-----
-----fggfam l l wiga--i lcfv
aysx-----xxxxxee--paddn l ylgiv
l sav-v-----i vtgifsyqqe-----sk-----ss--ki
mesfkn--mv-----

-----pqf-atv-----
-----ire-----ge--klt-----l
r-----
----aedLV LGDVVEVkf-----
----GDRIPADIRI l ea-----

-----r--nfkVDNSSLTGESEPQSRga-

-----XXXXXXXX
xxt-----
-----k-----NLAFF--STNA-----
ve--gtak-----gVVlSCGDHTVMGr i ag l asg-----

-----ldtgetpiake i hhfi h l itgvavflgtvff
-viafi l gy-----hwl davi fi l l G l l VAN
VPEGLLATvTVCLTLTAK-RMaskn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndnqi i-----

-----xxxxx--exx--
xxxxxdrtspgfx-----
-----a l
sriatic-----nrae-----
-----f--kxgqxxxxxxxx-----

-----evsgdase--aal lkc-----
-----melalgd--vmni xx-----

-----rnkkiaevpfnstnkxqvs i-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rilercstifingk-----

ekvldeemkeaf--nnayme l--ggl--gervLGFCDfml-----
-----xxxxxxgfkfntddinxpidnlrfVGLMSMIDPPRAAVPDAVAKCRSag-IKV
IMVTGDHPITAKAIAKSVG l-----i sexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxxx-----xxxavvhgae l r-----

-----dvssdq l de-----

i l r y h x x i V F A — R T S P Q Q K L I I V E G C q —
 — r m — g a ————— I V A V T G D G V N D S P A L K K A D I G V A M —
 ————— x i a g s d v —————

```
-----|r rnpX-----xxxxxxx-----
```

[illegible]

-----h--gckVDNSSLTGESEPQTRtp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
ve---gtar-----gIVINTGDRTVMGriatlasg-----

-----levgrtpisieiehfihiitgvavflgvsff
-ilslilgy-----swleaviflIGLIIVAN
VPEGLLATvTVCLTLTAK-RMakkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdrssatwx-----
-----aI
arvaglc---nraV-----
-----f---Ixeqxxxxxxxxx-----

-----dvagdase--salIk-----
-----ielccgs--vkemxx-----

-----kynkiseipfnstnkxqlsi-----

-----xxxxxx--xxxxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcssiliqk-----

eqplddemkdaf-qnaylel-ggl-gervLGFCHFnI-----
-----xxxxxxdfqfdteevnxptenlcfIGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxxx-----xxxcv ihggdlk-----
-----dl speqldd-----

vlkhxxiVFA-RTSPQQLIIVEGCq-----
--rq-ga-----IVAVTGDGVNDSPALKKADIGVAM--
-----xiagsdv-----

-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKS-----A
ytl-tsn-i-peitpflfiiani-----p--lplgtvtilci
dlgtdmvpaislayeaae-rd-----imkrqpr--nxktdklvnerl
ixiaygqigmi-qalagfftyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqrkix-----
ef---tchtafftsivivqwad-liicktrxxsvfqq-----gm-knkilifglfee
talaafIs-ycxxmdv-----alrmypl-----
-----kpnwwf--ca--fpysllifiyd-----
-----eirkli-----

-----irrspx-----xxxxxxx-----

y

>drell_IIC02 NP_571762.1

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XX

XXXXXXXXXXXXXXXXXXXX

dhkltldelr

kyg

tdmikglssfr

akevlrdgpnaltpptt

-pqwvkfckq-l

-----fggfqtllwfga--flcfl
aygx-----xxxxxed--aahdnlylglv
lafv-v-----ivngwfsfyqe-----sk-----ss--ki
mesfrn--lv-----

-----pqq-alv-----
----vrd-----ge--kkv-----i
n-----
----aeeVVVGDLIEVcg-----
----GDRIPADLRIVya-----

-----xx-----ckVDNSSLTGESEPQSRsp-

-----xxxxxxx
xxt-----
-----k-----NIAFF--STNC-----
ve--gtar-----gIAISTGDRTIMGriaslass-----

-----legqtpiareiehfihiisavsiflgvtff
-vlsilgy-----awieavvfllGIIIVAN
VPEGLPATvTVCLTLTAK-RMakkn-----

-----cLVK-NLEAVETLGSTTTICSDKTG-----
-----TLTQNRMTVa-----hmfdsqih-----

-----xxxxx--exx-
xxxxxdrssptwx-----
-----al
arvaglc--nraV-----
-----f--rxeqxxxxxxxxx-----

etagdase—sal lkc—
ielccgs—viemxx—
kyrkiceipfnstnkxqlsv—
xxxxxxx—xxxxxxxx—
m—k—gap
e—rildrcstilingk—
eqpmddenkdsf—qsayvel—ggl—gervLGFCQFnI—
xxxxxxxxgfafdpedvnxptenlcfLGLMSMIDPPRAAVPDAVAKCRSag—IKV
IMVTGDHPITAKAIAKGVGI—i sexxe—
xxxxxx
x—x—xxxxxxxx—xxxx—xxxcvvhgge l k—
nmndsd l de
ilryhxxiVFA—RTSPQQKL I IVEGCq—
rq—ga—IVAVTGDGVNDSPALKKAD IGVAM—
xisgsdv—
SKQAADMILLd—DNFASIVtgVEEGRL IFDNLKKS I—A

```

ytl-tsk-i-pemspflmfvvvgi-----p--lplgtvtlilfi
dlgtdlipaisyayenae-nd-----imkrqpr--nxqkdrlvnerl
ixmaygqigmi--qavagfftyxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xegrkix-----
es---tchtaffisivvvqwad-llivktrxxsilqq-----gm-knkvlifaffee
galaafis-ycxxmdi-----avrmypI-----
-----rplwwf---ta--lpyaliiiffyd-----
-----eirkyi-----

```

y

-----XXXXXXXXXXXXXXXXXXXXX-X-----XX-----

-----XXXXXXXXXXXXX
dhkltldehr-----

-----kyg-----tdltrglssr-----

-----arevlardgpna ltpptt-----
-pewvkfckq-l-----
-----fggfstllwiga--ilcfl
aygx-----xxxxdd--ptndnlylgiv
lagv-v-----iitgcfsyyqe-----ak-----ss--ki
mesfkn--lv-----

-----pqq-alv-----
-----vrd-----ge--kks-----i
n-----
-----aeeVVAGDLVEVkg-----
-----GDRIPADLRllsa-----

-----h--gckVDNSSLTGESEPQTRtp-----

-----XXXXXXXX
xxt-----
-----r-----NIAFF--STNC-----
ve--gtar-----glVINTGDRTVMGriatlass-----

-----leggqtpiakeiehfihiitgvavflgvsff
-ilslilgy-----gwleavifllGIIVAN
VPEGLLATvTVCLTLTAK-RMakkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfdsqih-----

-----xxxxx-exx-
xxxxxdrssptwx-----
-----a l
arvaglc-----nra v-----
-----f---lxdqxxxxxxxx-----

-----dtagdase-sal lkc-----
-----ielccgs-vnemxx-----

-----kytkiaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcstiliqk-----

qqpldeemkda f-qnayvel-ggl-----gervLGFCHFcl-----
-----xxxxxxxxgfafdtteevnxptenlcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxxx-----xxxx-----xxxcvvhggek-----

-----smsee ldd-----

i l k h x x i V F A — R T S P Q Q K L I I V E G C q —
 — r q — g a ————— I V A V T G D G V N D S P A L K K A D I G V A M —
 ————— x i a g s d v —————

```
-----|rrspx-----xxxxxxx-----
```

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-XX-----
-----XXXXXXXXXXXXXXXXXXXX-
dhkltmeelsr-----
-----kyg-----tdltkglpvsr-----
-----amevlmrdgpnaltppv it-----
-pewvrfcrcq-l-----
-----fggfqtllwiga-flcyf
afsx-----xxxxx-e-pvndnlylgiv
ltfv-v-----tvngcfsysqe-----ak-----sc-----ri
mdsfkn-lv-----
-----pqk-alv-----
-----vrd-----ge-kki-----i
d-----
-----aeeVVVGDLVEVkg-----
-----GDKIPADIRIVss-----

-----h--gckVDNSSLTGESEPQIRta-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
id---gaar-----gIVVNTGDRTVMGr ias lasn-----

-----leggqtplgreiehfihi itgvavflgttfl
-iisvmlgf-----twlegi ifl IGLIVAN
VPEGLPCTvTVALTLTAK-HMakkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdrssatwx-----
-----a l
arvaglc---nra v-----
-----f---qxnqxxxxxxxxx-----

-----etagdase--sa l lkc-----
-----ielccgs--vtemxx-----

-----nypkvaeipfnsiskxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcstiliiegk-----

ehplddemkedf-qnayvql--ggl---gervLGFCHFgl-----
-----xxxxxxgfafdteemnxptenlcfVGLMSMIDPPRAAVPDAVAKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----i sexxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxx-----xxxcv ihggelk-----

-----nmtdeqldd-----

vlqhhxxiVFA--RTSPQQKL I IVEGCq-----
--rq--ga-----IVAVTGDGVNDSPALKKADIGVAM--
-----xiagsdv-----

-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKS I-----C
ytl--stk-i-pemspfImfvlagi-----p--lplgtvtilci
dlgtdmvpaisfayenae-sd-----imkrqpr--nxatdrlvnerl
vxvsygqigvm--nafggfftyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqrkvx-----
ey---tchtayftsivimqwtl-l lvcksrxxslakq-----gm-knrvltfslfee
taiaafIs--ycxxmdi-----avrmypl-----
-----kpmwwf--ca--fpymilifiyd-----
-----evrkhf-----

-----irqnpX-----xxxxxxx-----

y

>drell_IIC05 NP_571765.1

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XX

XXXXXXXXXXXXXXXXXXXX

dhkltleelnr

kyg

tdlnrglttar

aaei lardgpnaltppptt

pewvkfckq-m

-----fggfsmllwtga--llcfl
aygx-----xxxxxde--pandnlylgvv
lsav-v-----iitgcfsyyqe-----ak-----ss--ki
mdsfkn--lv-----

-----pqq-alv-----
----vrd-----ge--knh-----v
n-----
----aeeVVVGDLVEVkg-----
----GDRIPADLRllas-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
ve--gtar-----gIVISTGDRTVMGriatlasg-----

-----levgrtpisieiehfihiitgvavflgvsff
-vlsalgy-----swleaviflIGLIIVAN
VPEGLLATvTVCLTLTAK-RMakkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdrssatwx-----
-----sI
arvaglc--nraV-----
-----f--lxeqxxxxxxxxx-----

-----dvagdase--sal|kc-----
-----ielccgs--vkdmxx-----

-----kytkvaeipfnstnkxqlsv-----

-----xxxxxxx-----xxxxxxxx-----
-m-----k-----gap
e-----rildrcstiliqgk-----

vqalddemkeaf-qnaylel--gg|----gervLGFCDFc|-----
-----xxxxxxxgfpfdtedvnxpntencfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVG|-----isexxe-----

-----xxxxxxxx-----
x-x-----xxxxxxxx-----xxxx-----xxxcvvhggd|k-----

-----dlisceqlld-----

ilkhxxivFA--RTSPQQLIIVEGCq-----
--rq-ga-----IVAVTGDGVNDSPALKKADIGVAM-----
--xiagsdv-----

-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKS|-----A

-----|rrnpx-----xxxxxxxx-----

m

Handwriting practice sheet with primary-ruled lines. The sheet includes a header section with a large 'm' and a dashed line, followed by ten rows of primary-ruled lines (solid top line, dashed middle line, solid bottom line).

-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXX
dhkltldelst-----

-----ryg-----vdlarglthkr-----

-----ameilardgpnaltppptt-----
-pewvkfckq-l-----
-----fggfsillwiga--ilcfl
aysx-----xxxxxde--pvndnlylgvv
lsav-v-----iitgcfsyyqe-----ak-----ss--ri
mdsfkn-mv-----

-----pqq-alv-----
-----ird-----ge-klq-----i
n-----
---aeeVQGDLElkg-----
---GDRVPADLRlss-----

-----s--gckVDNSSLTGESEPQTRsp-

-----XXXXXXXXXXXX
xxt-----
-----r-----NISFF--STNC-----
ve--gtah-----gIVIATGDHTVMGriatlasg-----

-----levgqtpinmeiehfihiitgvaiflgmsff
-ilsiilgy-----twleavifiIIGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndqih-----

-----xxxxx-exx-
xxxxxdkssptwx-----
-----sI
srvgglc-----nraV-----
-----f-----kxgqxxxxxxxx-----

-----dtagdase-salIkc-----
-----veIsgn-vetIxx-----

-----nnrkvaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxx-----
-m-----k-----
-----gap
e-----rildrcstimminge-----

efpidddwmdaf-qgaymeI--ggl-----gervLGFCHLfI-----
-----xxxxxxgfeIcdcdvnxpvnqIcfLGLISMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxxx-----xxxx-----xxxcvvhgsdIk-----

-----dmsaeyIdd-----

i l r n h x x i V F A — R T S P Q Q K L I I V E G C q —
 — r q — g a ————— I V A V T G D G V N D S P A L K K A D I G V A M —
 ————— x i t g s d v —————

```
-----|rrnpx-----xxxxxxx-----
```


[illegible]

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
ve---gtar-----gVVVCTGDRTVMGriatltsg-----

-----letgktpiakeiehfihiitgvavflgvsff
-ilavilgy-----twleavifllGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdkssvtwx-----
-----aI
arvaalc---nraV-----
-----f---kxgqxxxxxxxx-----

-----dvagdase--salIk-----
-----ielscgs--vkvmxx-----

-----knkkvaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcstimlgk-----

eqpmdeemkeaf-qnaylel-ggl-gervLGFCHVIm-----
-----xxxxxxxgfaftddvnxqtdnlcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxx-----xxx-----xxxcv ihgtdlk-----
-----dysqeqide-----

vlrnhxxiVFA-RTSPQQLIIVEGCq-----
--rq-ga-----IVAVTGDGVNDSPALKKADIGVAM--
-----xisgsdv-----

-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKS-----A
ytl-tsn-i-peitpflfiivni-----p--lplgtitilci
dlgtdmvpaislayeaae-sd-----imkrqpr--nxmrdklvnerl
ixiaygqigmi-qalggffayfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqrkix-----
ef---tchtaffvsivvvqwad-viicktrxxsvfqq-----gm-knkilifglfee
talaafIs-ycxxmdv-----alrmypl-----
-----kpswwf--ca--fpysflifvyd-----
-----evrkll-----

-----lrrnpx-----xxxxxxx-----

y

>drell_IIC08 NP_571759.2

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXX

ehkmsieevcr

kyn tdivqgltnar

aaeylardgpnaltpptt

pewvkfcrcq-l

-----fggfsillwiga--ilcfl
ayax-----xxxxxde--pagdnlylgiv
lsav-v-----iitgcfsyfqe-----ak-----ss--ki
mesfkn--mv-----

-----pqq-alv-----
----ire-----ge-klq-----i
n-----
---aeeVGGDLVEVkg-----
----GDRIPADLRllsa-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
ve--gtar-----gIVVCTGDRTVMGriatltsq-----

-----letgktpiakeiehfihiitgvavflgtvff
-ilsiilgy-----swleavifllGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdkssgtwx-----
-----al
arvaalc--nra-----
-----f--kxgqxxxxxxxx-----

dvagdase--sal|lc--
ielscgs--vkamxx
knkkvaeipfnstnkxqlsv
xxxxxxx-----xxxxxxxx
-m-----k-----gap
e-----rildrcstilqgk
eqpmdeeleaf-qnaylel--gg|--gervLGFCHLvm
-----xxxxxxxxgfafdtddinxqtndlcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe
-----xxxxxx
x-x-----xxxxxxxx--xxxx-----xxxcvihgtldlk
-----dlsqdmde
v|knhxxiVFA--RTSPQQLIIVEGCq
--rq-ga-----IVAVTGDGVNDSPALKKADIGVAM
--xisgsdv
-----SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKSII-----A

-----|rrnpx-----xxxxxxxx-----

a

-----XXXXXXXXXXXXXXXXXXXX-----XX-----

-----XXXXXXXXXXXXXXXXXXXX
dhklsldelhr-----

-----kyg-----tdlsrglttar-----

-----aaeilardgpntltppptt-----
-pewvkfcrq-l-----
-----fggfslllwigs--llcfl
aygx-----xxxxxge--pntdnlylgvv
laav-v-----iitgcfssyyqe-----ak-----ss--ki
mesfkn-mv-----

-----pqq-alv-----
-----vrn-----ge-kms-----i
n-----
-----aegVVVGDLVEVkg-----
-----GDRIPADLRllsa-----

-----h--gckVDNSSLTGESEPQTRsp-

-----XXXXXXXX
xxt-----
-----r-----NIAFF--STNC-----
ve--gtar-----gIVISTGDRTVMGriaslasg-----

-----leggktpiameiehfihlitgvavflgvsff
-ilsliley-----twleavifllGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndqih-----

-----xxxxx-exx-
xxxxxdkssatwx-----
-----aI
srvaglc-----nraV-----
-----f-----qxnxqxxxxxxxx-----

-----avagdase-salIkc-----
-----ielccgs-vkemxx-----

-----rypkvveipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcdsilihgk-----

vqpldeemkdsf-qnaylel-ggl-----gervLGFCHLaI-----
-----xxxxxxxxgfqfdtdevnxpvekIcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x-x-----xxxxxxxx-----xxxx-----xxxcvvhgsdIk-----

-----dmtseqIdd-----

[illegible]

[illegible]

-----q--gckVDNSSLTGESEPQPRsc-----

-----x-----xxxxx-----

-----x
xxt-----
-----r-----NIAFY--STTC-----
ve---gtat-----gIVINTGDRTII Gri as lasg-----

-----vgnekt pia ie i ehfvy l vagv a i sigv l ff
-i i s v sm ry-----k i l d s i i f l l G l l V A N
V P E G L L A T v T V S L S L T A K - R M a k k n-----

-----cLVK-NLEAVETLGSTSI I CSDKTG-----
-----TLTQNRMTVa-----hlwfdnqi y-----

-----xxxxx--exx--
xxxxxdqsspswx-----
-----a l
skivtlc---nrae-----
-----f---rxgqxxxxxxxx-----

-----vvvgdase--ta l l kf-----
-----aevv l gd--vmn i xx-----

-----rnkkvaeipfnstnkxql s i-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----r i l e r c s t i m i n g k-----

eepldsekaef-qtayme|---gg|---gervLGFCHLy|-----
-----xxxxxxtypfdtdsmnxptsnlcfVGLLSMIDPPRSTVPDAVSKCRSag-IKV
IMVTGDHPITAKAIAKSVG|-----isaxxe-----

-----xxxxxx
x--x-----xxxxxxxx--xxx-----xxxavvngmek-----

-----dmslqelde-----

ilcdhxxiVFA--RTSPQQLIIVEGCq-----
---rq-ga-----VVAVTGDGVNDSPALKKADIGIAM--
-----xiagsda-----

-----AKNAADMVLLd-DNFASIVtgVEEGRLIFDNLKKTl-----A
ytl-tnk-i-aelcpfliyiiasi-----p--mpigtitilfi
dlgtdiipsvalayekae-sd-----imnrpr--nxkkdrlvneql
axysylqigim--qsvgafvtyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xyqrtyx-----
qw---tgytaffvsitiqqvad-liirktrxxsifqq-----glxrnkviwvgifsq
igialilt-ygxxhvt-----alnftpl-----
-----rfqywf---va--vpfavliwvyd-----
-----evrklf-----

-----irrypx-----xxxxxxx-----

y

>mmu11_11C01 NP_659149.1

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XX

XXXXXXXXXXXXXXXXXXXX

dhklsldelhr

kyg

tdlsrgltpar

aaei lardgpnaltppptt

-pewvkfcrcq-l

-----fggfsmllwiga--ilcfl
aygx-----xxxxxee--ppnddlylgvv
lsav-v-----iitgcfsyyqe-----ak-----ss--ki
mesfkn--mv-----

-----pqq-alv-----
-----irn-----ge--kms-----i
n-----
----aedVVVGDLVEVkg-----
----GDRIPADLRllsa-----

-----n--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STNC-----
ve--gtar-----gIVVYTGDRVTMGriatlasg-----

-----legqtpiaeeiehfihlitgvavflgvsff
-ilsliley-----twleaviflIGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndqih-----

-----xxxxx--exx-
xxxxxdktsatwx-----
-----al
sriaglc--nra-----
-----f--qxnqxxxxxxxx-----

avagdase--sal|kc--
 -----ievccgs--vmemxx-----
 -----kyskiveipfnstnkxqlsi-----
 -----xxxxxx-----xxxxxxx-----
 -m-----k-----gap
 e-----rildrcssillhgk-----
 eqpldeekdaf-qnaylel--ggl--gervLGFCHLl|-----
 -----xxxxxxgfgfdtdvnxpvdnlcfVGLISMIDPPRAAVPDAVGKCRSag-|KV
 |MVTGDHP|TAKA|AKGVGI-----i sexxe-----
 -----xxxxxx-----
 x--x-----xxxxxxx-----xxx-----xxxcvvhgds|k-----
 -----dmtsee|dd-----
 ilryhxxiVFA--RTSPQQKL|IVEGCq-----
 --rq--ga-----|VAVTGDGVNDSPALKKAD|GVAM--
 --xivgsdv-----
 -----SKQAADMILLd-DNFASIVtgVEEGRL|FDNLKKS|-----A

-----irrrpx-----xxxxxxxx-----

A handwriting practice sheet for the letter 'm'. It features a large 'm' at the top left, followed by a series of horizontal lines. Each line set consists of a solid top line, a dashed middle line, and a solid bottom line, providing a guide for letter height and placement.

-----XXXXXXXXXXXXXXXXXXXX-----XX-----

-----XXXXXXXXXXXX
dhklsldelgr-----

-----kyq-----vdl skgltnqr-----

-----aqdi lardgpnaltppptt-----
-pewvkfcrq-l-----
-----fggfsillwiga--llcfl
aygx-----xxxxxde--psndnlylgiv
laav-v-----ivtgcfsyyqe-----ak-----ss--ki
mdsfkn-mv-----

-----pqq-alv-----
-----ire-----ge--kmq-----i
n-----
---aeeVVVGDLVEVkg-----
---GDRVPADLRl lss-----

-----h--gckVDNSSLTGESEPQTRsp-

-----XXXXXXXX
xxt-----
-----r-----NICFF--STNC-----
ve--gtar-----gIVIATGDRTVMGriatlasg-----

-----levgqtpiameiehfiqlitgvavflgvsff
-vlsilgy-----swleavifiIIGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndqih-----

-----xxxxx-exx-
xxxxxdkrsptwx-----
-----aI
sriaglc-----nraV-----
-----f-----kxgqxxxxxxxx-----

-----dtagdase-salIkc-----
-----ielscgs-vrkmtx-----

-----rnpkvaepfnstnkxqlsi-----

-----xxxxxx-----xxxxxx-----
-m-----k-----
-----gap
e-----rildrcstlvgk-----

eipldkemqdaf-qnaymeI--ggl-----gervLGFCQLnI-----
-----xxxxxxgfkfdtdelnxpteklcfVGLMSMIDPPRAAVPDAVGKCRSag-IKV
IMVTGDHPITAKAIAKGVGI-----isexxe-----

-----xxxxxx
x--x-----xxxxxxxx-----xxxx-----xxxcvvhgsdIk-----

-----dmtseqIde-----

-----x-----xxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxx-----

ehkmsveevcr-----

-----kyn-----tdcvqglthsk-----

-----aqei lardgpnaltppptt-----

-pewvkfcrq-l-----

-----fggfsillwiga--ilcfl-----

aygx-----xxxxxdd--psgdhlylgiv-----

laav-v-----iitgcfsyyqe-----ak-----ss-----ki-----

mesfkn--mv-----

-----pqq--alv-----

-----ire-----ge--kmq-----v-----

n-----

-----aeeVVVGDLVElkg-----

-----GDRVPADLRlIsa-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NITFF--STNC-----
ve---gtar-----gVVVATGDRTVMGriatlasg-----

-----levgktpiaieiehfiqlitgvavflgvsff
-ilslilgy-----twleaviflIGLIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
xxxxxdksshtwx-----
-----aI
shiaglc---nraV-----
-----f---kxgqxxxxxxxx-

-----dvagdase--salIk-----
-----ielssgs--vklmxx-----

-----rnkkvaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxxx-----
-m-----k-----
-----gap
e-----rildrcatillgk-----

-XXXX-

>mmuII_IIC04 NP_619593.1

m-

[illegible]

-XXX-XXXXXXXXXX

dhr | sntd | eq-

-kyg-----tni i qglssir

-aaellardgpna|tppkqt-

-pe i i k f l k q-m-

-----vggfsillwiga--alcwi
ayvx-----xxxxxt---asldnvylgai
lvlv-v-----iltgifayyqe-----ak-----st---ni
masfsk--mi-----

-----pqq-alv-----
-----ird-----ae--kki-----i
p-----
-----aeqLVGDVVElkg-----
-----GDQIPADIRLVfs-----

-----xx-----ckVDNSSLTGESEPQARst-

-----xxxxxxx
xxt-----
-----k-----NIGFY--STTC-----
le---gtat-----gIVINTGDRTIIGriaslasg-----

-----vgsektpiaieiehfvhivaavavsvgviff
-itavcmky-----yvldaiifiIISIIVAN
VPEGLLATvTVTLSTAK-RMakkn-----

-----cLVK-NLEAVETLGSTSIICSDKTG-----
-----TLTQNRMTVa-----hlwfdnqif-----

-----xxxxx--exx-
xxxxxdqssgtwx-----
-----sI
skiitlc---nrae-----
-----f---rxgqxxxxxxxxx-----

vvvgdase--tal lkf--
 --sevilgd--vmdixx--
 --rnhkvaepfnstnkxqlsi--
 -----xxxxxxx-----xxxxxxxx--
 -m-----k-----gap
 e-----rilekcstimingq-----
 eqpldkssadaf--htaymel--ggl--gervLGFCHLyI-----
 -----xxxxxxxxsytfdvdsinxptsnlcfVGLLSMIDPPRSTVPDAVSKCRSag-IKV
 IMVTGDHPITAKAIAKSVGI-----isaxxe-----
 -----xxxxxxxx--
 x--x-----xxxxxxxx--xxxx-----xxxavvtgmelk-----
 -----dmtpeqlde-----
 I linyxxiVFA--RTSPQQKL I IVEGCq-----
 --rq--da-----VVAVTGDGVNDSPALKKADIGIAM--
 --xiagsda-----
 -----AKNAADMVLLd-DNFASIVtgVEEGRLIFDNLKKT I-----A

XX--

-----XX
eheltleqise-----

-----kfsxxxxxx-pslssglqsl-----

-----anellirngknikppkev-----
-pwyvqlgkc-f-----
-----tnffmillevag--alcfl
aygx-----dr--nqrvnlylacv
lyai-v-----iftclltsqe-----rq-----tg--ni
mksfkn--ll-----

-----pqs-crv-----
----ird-----gs-etk-----v
k-----
----vedIVGDIVMCqa-----
----GDKVPADIRIltc-----

-----n--gmkVDNSSLTGESDAQSctv--

-----xxxxxx-----

-----x
xxt-----
-----h-----NLAFC--GTLV-----
md--gsar-----gVVIRTGSNTLIGkiadlasn-----

-----teqtettlqieikrfvhfitalgitmgliiff
-iigfavgi-----dsiqnlinvLGLIVAN
VPEGLPSTiTACLTVTAR-RLsrrn-----

-----vYSK-KLES IETLGSITL IASDKTG-----
-----TLTQNRMTVs-----hmwydntiv-----

-----xxxxx--gxxx
xxxxxdigtptcx-----
-----a l
Invgacc-----nrad-----
-----fxxxlxgnxxxxxxxx-----

-----lilgdase--sailrl-----
-----chtied--ieitxx-----

-----knpkvfeipfnstnkxqlsi-----

-----XXXXXXXXXXXXXXXXXXXXX-----
-m-----k-----
-----gap
e-----iifecksklmingk-----

eleidekikndf-iqayea l--gsm--gercLGFAQL l l-----
-----xxxxxxxxndmydaqtlnxpmtgltfVGLCSLLDPPRENVPF AVHQCKTag-IKV
IMVTGDHPITAKAIAKKVGI-----is--xp-----

-----xxxxxx
x--x-----xxxxxxx-----xxxx-----xxxvv l hggqir-----

-----eltdadwdr-----

vl-skxxiVFA--RTSPQKKSQIVENAq-----
--kr--ke-----VVAVTGDGVNDSPALKKADIGVAM--
-----xivgsdv-----

-----AKETADILLd-DNFASIVagIEEGRIFDNLKKS|-----A
ytl-sha-v-pevapfllniisgi-----p--laitsfliilci
dlgtemapaislayetge-kd-----imsrkpr--vxgkdhlvttnl
lxysylqagpi--eaiisflnffxxxxxxxxxxxxxxxxxxxx--xxxxxxxxxxxxxxxxxxxx
xqvealx-----
q-----aqtayfmtlvtcqffn-litnrtrxxplwsh-----kixsnwyiniglvie
agicafov--ytxxvht-----iesasv-----
-----pglfwa--yp--lpmifclfswn-----
-----eirkri-----

-----aydrpx-----xxxxxxx-----

f
>ddill_IIC02 XP_647420.1
m-----

-----XXXXXXXXXXXX
XX
XX
XX
XX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX
kepmsaidlaq-----

-----xxxxxxxxxxdla-----tqtteelthdh-----

-----XXXXXXXXXXXX
xxxxxxxxxxxxxxxxxxxxxaserleidgkna!tpskpv-----
-pkwvki!ke-f-----
-----lglfpimlevgg--ilsii
afgx-----xte--tgkdnlylgii
lwiv-v-----fltctfsyiqn-----sk-----st--gv
megfkk--la-----

-----pss-tkv-----
-----lrd-----dn--lie-----i
d-----
-----sedLVGDVVIVra-----
-----GDKVPADLRVIas-----

-----h--hfkVDNASLTGETEPQTRsp-

-----xxxxxxx
xxt-----
-----q-----NLTFY--GTLA-----
cq----gdcv-----gVVIATGDRTVIGkiaklasn-----

-----skpnstpmkeeiekfikiisivafslgaifl
-aigfgrsv-----ewilviiytIGIVSQ
VPEALLPTITVTLNLTAK-RMsrkn-----

-----vLVK-NLLTVETLGSTTTIASDKTG-----
-----TLTQNIMTVv-----hlwydgtiy-----

-----xxxxx--t--
xxxxxnaqattfx-----
-----kl
yqvaalc----nrtv-----
-----fxx-sxnqxxxxxxxx-----

-----kcidgase--salikf-----
-----ceqv-en--veqyxx-----

-----rfpkyfeipfnsvnkxqmsv-----

-----xxxxxx-----xxxxxx-----
-m-----k-----
-----gap
e-----riikmcnriliege-----

eqel dekh lqnf-qssyeh l---agk---gervLGLAYLp l-----
-----xxxxxxxny i fdmeeknxptkd l v fVGL TALMDPPRPGVPEA l RTCKEag-l RV
MMVTGDHPLTGTA l AKQVG l-----i exxe-----

```

i l - s l x x l C F C - - R T S P E Q K L Q I V A H L q - - - - -
- - - - - k r - - g e - - - - - I V A V T G D G V N D S P A L K K A D L G C A M - -
- - - - - x i t g s d v - - - - -

```

```
-----irryp-----xxxxxxxx-----
```

w

>mgrII_IIC01 XP_360070.2

m

gy-l

-----fkgfgpvllvga--ilvfi
awk-----xxxx-----xpq-----tanlalaiv
llav-f-----fiqaafnmwqd-----ws-----ss----rv
masikt--ml-----

-----pde-cmv-----
-----lrd-----gv--qvn-----m
f-----
----aadiVPGDILVika-----
----GNKLPAVRFCEv-----

-----xxdakFDRSILTGESLPLPAtv-----

-----xxxxxxx-----

xxt-----
-----r-----CIGLQ--GTHC-----
vs--gtch-----gIVVATGNKTVFGriakltne-----

-----pkkgmttlerevlnfvwiicsimvlmvvlvi
-ilwatwlrxxxxxxx-----svsglivscVSVAVAF
IPEGLPVAITASLTISAN-MMrknk-----

-----vLCK-SLKTVELGAVSVICSDKTG-----
-----TLTGNKMVVt-----dcalggqth-----

-----xxxxxxxlxxx
xxxxxseec|agxxxx-----
-----ql
rtisalxxxxxdat-----
-----rxxxlxnr-----

ringdatd-qailrf
aetmgs-amatxx
cwqtrfdlafnsknkxmrvxxxxxxxxxx
dxxxxxxxxxxxxxxxxxxxxk
gap
d-vllgrctkyvgssgx
tlnlspaardeveriknew-sar-grrvLLLARKvl
xxxxxxxxxxspafereamdxassgltlVGLVAIADPPRPEIPGVVKTLRGag-IRI
FMVTGDFALTAQAIAREGI-itnxxs
xxxxxx
xxxxxxxxxx-xxxx-xxivisgadma
gm|snqwde
laaeyxxvVFA-RTTPEQKLRIVRELq
sr-hh-IVGMTGDGVNDAPALRAADVGLAI
gggsdi
AAEAADMVLL-ESFGSVVeaVRYGRITFDNLKKTl

yl|xags-f-sefwpmtnvmfgl-----p--qilssflmiii
ccftdclagiamayeape-ad-----vlmrppr---rxgvdhlvdwkl
vxhsygvvglm--etvvsfamsyxxxxxx-----xxxxxxx
xfgfgnxxxxxxxxxxxxx-----
ln---vassiyfvtlvvmqwf-n-lamrtr--rlsifxxxxxxkdxqnlwivpavlfs
lvmaffwl--yixxlqv-----tlgttav-----
-----pveywf---lp--mafglalld-----
-----egrkya-----

-----vrawpxxxxxxx-----

w

>mgrll_11C02 XP_365182.2

m-----

-----XX-----

-----XXXXXXXX-----XXXXXXXXXXXXXXXXXXXX
ihelsteticq-----

-----qln-----vsqdaglssta-----

-----aktrierdgpnvmphpktn-----
--yfkki lmy-l-----
-----fggfcsvlwvgv--ivffi
cwqx-----xxdp--psptnlalail
iliv-i-----flqagfsafqd-----ws-----ts--nt
mksign--ll-----

-----pse-tlv-----
----ird-----gq--emr-----l
p-----
----aseLVAGDVVRlsm-----
----GNKVPADMRLVst-----

-----xxdirFDRAMLTGESDEVEGav-----

-----XXXXXXX-----

xxt-----
-----r-----NIALM--GTLV-----
vn--gsgt-----gVVVLTGTRSVMGr i aqamsn-----

-----vseketliqreivr fvk i v c f t i a l a s l i a
-iawgawlrxxxxxx-----svvamlnnvMGCVVAF
IPEGMPIAvSLTLMIVAR-RMkasn-----

-----iLPK-GLATVETLGCVNVVCSDKTG-----
-----TLTQNKMTVs-----svafvdses-----

-----vxxx
xxxxxqeerpmaxx-----
-----kl
heaavlcxxxxeptt-----
-----txxxvxer-----

-----avrnatd-aavlr-----
-----aaqgervxxvrprxx-----

-----dfkv-pfnsknxmltm-----

-----xxxxxxxxxxxxxxxxk-----
-----gap
d-----vllphctnywsagxxx-----

vrpldgearatl-kgfqdkm-srr-aervllCETtf-----
-----xxxxxxxxnafsdexasixktgltvIALLGIDPPRPETAHTISECRRag-IRF
FMVTGDYGLTASAIARNIGL-----frgxxe-----

-----xxllvegpeia-----

-----tlstddwd-----

vvceyxvVFA—RTTPEQKLRIVTELq—
 —ar—hn—VVAVTGDGVNDAPAMRKADVGAV—
 —i sgsv—

```
--vr | fpxxxxxxxxx-
```


ehivpieelva
-xxxxx
-xxxxxxxxxxxxxxxx
-rlg-tnletgltrqk-
-aqevlakngpnalsppett-
-pewikfckn-l-
-fggfamllwvga-ilcyi
aysx-xxxxxey-pskdnlylgiv
lmtv-v-vitgvfqyyqe-sk-ss-ki
mdsfkn-mv
-ptf-alv
-hrd-gq-kqq-v
k-
-teeLVGDIVEVkg-
-GDRVPADLRVVs-

-----f--gfkVDNSSLTGESEPQSRsp-

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xxt-----
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VPEGLIATvTVCLTLTAK-RMaskn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmwydetih-----

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xxxx-krtgasfx-----
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vriaslc---nrae-----
-----f--kxgqxxxxxxxx-----

-----dctgdase--iallkf-----
-----tel tqn--viavxx-----

-----knkkiaeipfnstnkxqvs i-----

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-----gap
e-----rildvcstifl ngk-----

eselt dkl redf-ntaylel--ggm---gervLGFCDFv|-----
-----xxxxxxxgfkfdveevnxplkn|rfVGLMSMIDPPRAAVPDAVAKCRSag-IKV
VMVTGDHPITAKAIAKSVG|-----isdxxe-----

-----xxxxxx
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-----emsedqlae-----

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-----xiagsdv-----

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dlgt dmpaislayeeae-sd-----imkrqpr--dxirdklvnerl
ixlaygqigmi--qasagfftyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xanrkix-----
ey---tcqtayfvsivvvqwad-liisktrxxslvqq-----gm-snwtlnfglvfe
talawfmc--ycxxldn-----glrmygl-----
-----rfswwf--ca--lpfsilifvyd-----
-----eirrf|-----

-----irrypx-----xxxxxxx-----

y

>hsall_IIC01 NP_000692.2

m

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

XX

XXXXXXXXXXXXXXXXXXXX

dhklsldelhr

kyg

tdlsrgltsar

aaei lardgpnaltppptt

pewikfcrq-l

-----fggfsmllwiga--ilcfl
aysx-----xxxxxee--pqndnlylgvv
lsav-v-----iitgcfsyyqe-----ak-----ss--ki
mesfkn--mv-----

-----pqq-alv-----
-----irn-----ge--kms-----i
n-----
-----aeeVVVGDLVEVkg-----
-----GDRIPADLRllsa-----

-----n--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
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-----legqtpiaaeiehfihiitgvavflgvsff
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VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndnqih-----

-----xxxxx--exx-
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sriaglc--nraV-----
-----f--qxnxqxxxxxxxxx-----

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xxxxxxx-xxxxxxx
m-k
gap
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dmtseqldd
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rq-ga-IVAVTGDGVNDSPALKKADIGVAM
xiagsdv
SKQAADMILLd-DNFASIVtgVEEGRLIFDNLKKSIA

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ixmaygqigmi--qalggfftyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqrkix-----
ef---tchtaffvsivvvqwad-lvicktrxxsvfqq-----gm-knkilifglfee
talaafIs--ycxxmgv-----alrmypl-----
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-----evrkli-----

-----irrrpx-----xxxxxxx-----

y
>cellI_IIC02 NP_497034.1
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dheipldalfk-----

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-skwiklags-i-----
-----fggfnnflwcaa--sasav
gygx-----xxxxxxee--vpkdnmymai i
latv-v-----tvtgldfyqn-----rk-----sg--nl
mdsfan--mi-----

-----ppk-tlv-----
-----vrd-----ga-tre-----i
e-----
----vkdLVGDLVRFrg-----
----GDRVPADLRVTla-----

-----xgIkVDNSSLTGESEPQTRnm-----

-----XXXXXX
xxt-----
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-----gap
e-----kilklcstyqnge-----

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VMVTGDHPITARAIAQVHI-----ieexxq-----

-----xxxxxx
xxxx-----xxxxxxxxxxxxxxxx-----xxxvvi hgeqlt-----

-----tmspktlka-----

vvtnyxxiVFA--RTSPAQKLQIVEAFq-----
 ---sv--gn-----IVGVTGDGVNDAPALRKADIGIAM--
 -----xitgtdv-----

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dlgtdlwpaisfayevpe-sd-----imqrapr--nxlydklvnkr
vxfsymqigai--qacagfttyfxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xesrkax-----
es---ccygtffftivvtqwsd-lfasktrxxslvmq-----gm-enhvlnsvift
cflaifvl--ntxxvne-----vlgvqgf-----
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-----evrryf-----

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y
>cell_11C03 NP_505083.1
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aaqkl ktdgknal sppkt i
snmelfvrq-f
knllwv lmfga aalcfl
tyix dp tda lnlyvgif
ivai-v fimcvvsffee kk gv ev
vrafqt-lm
pts-cqv
ird gk-eil-
n
peelVVGdVVVVrs
GCKVPADMRI lac

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-----xxxxxxxx
xxs-----
-----y-----NIAFN--GSFC-----
vd---gegy-----gllIRTGENTVIGqiasltlg-----

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VPQGLPTTvTTELTIIAR-RMakkn-----

-----vFLK-KLEKIDSVGATTIASDKTG-----
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-----di
lsvicvc---nkar-----
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-----l isgnpse--vallry-----
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-----sfhvvfevpfnsvrkxhlil-----

-----xxxxxxxxxxxxxxxxxxxxxxxx-----
-i-----k-----
-----gap
d-----vlikscstinidgv-----

pmelngkrmdf-neayetf--gde---gcrvlgfACKkf-----
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YMTGDHKSTATA|ARQ|GM-----id--xe-----

-----xxxxxx
x-----xxxxxxxxxxx-----xavitgpelp-----
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ll-ehxxiVFA--RTTPEHKLMIVTESq-----
--kr--ge-----CVTVTDGVNDAPALKKADVGVAM--
-----xlagsdv-----

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dliitdippavslayegpe-ad-----imlqppr--k-rethlvtkgl
ixtylfmsif--isvggvvay|xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqqvfx-----
aa---qaaaafhiavvvgqawh-lwmc|tr--rvsifx-----hgxanivailaviid
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-----pwecwl---vp--vivgiwiwifn-----
-----elrkfg-----

-----irnypxxxxxxxxx-----

w

>hsall_l1c02 NP_000693.1

m

XXXXXXXXXXXXXXXXXXXX

XX

XXXXXXXXXXXXXXXX

dhklsldelgr

kyq

vdlskgtqr

aqdvlar dgpna ltpptt

pewvkfcrg-l

-----fggfsillwiga--ilcfl
aygx-----xxxxxde--psndnlylgvv
laav-v-----ivtgcfsyyqe-----ak-----ss--ki
mdsfkn--mv-----

-----pqq-alv-----
----ire-----ge--kmq-----i
n-----
---aeeVVVGDLVEVkg-----
---GDRVPADLRllss-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NICFF--STNC-----
ve--gtar-----gI VIATGDRTVMGriatlasg-----

-----levgrtpiameiehfiqlitgvavflgvsff
-vlsilgy-----swleaviflIGIIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfwdnqih-----

-----xxxxx--exx-
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-----al
sriaglc--nra-----
-----f--kxgqxxxxxxxx-----

-----dtagdase--sal lkc-----
-----iel scgs--vrkmxx-----

-----rnpkvaeipfnstnkxqlsi-----

-----xxxxxx-----xxxxxxx-----
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-----gap
e-----rildroesti lvqk-----

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-----xxxxxx
x--x-----xxxxxxxx--xxxx-----xxxcvvhg s d l k-----

-----dmtseq l de-----

i l k n h x x i V F A--RTSPQQKL I I V E G C q-----
---r q--ga-----I V A V T G D G V N D S P A L K K A D I G I A M--
-----x i s g s d v-----

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[illegible]

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ehkmsveevcr-----

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-pewvkfcrq-l-----
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aygx-----xxxxdd--psgdnllylgiv
laav-v-----iitgcfsyyqe-----ak-----ss--ki
mesfkn-mv-----

-----pqq-alv-----
----ire-----ge--kmq-----v
n-----
----aeeVVVGDLVElkg-----
----GDRVPADLRlIsa-----

-----h--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
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-----levgktpiaieiehfiqlitgvavflgvsff
-ilslilgy-----twleaviflIGlIVAN
VPEGLLATvTVCLTLTAK-RMarkn-----

-----cLVK-NLEAVETLGSTSTICSDKTG-----
-----TLTQNRMTVa-----hmfndqih-----

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xxxxxdksshtwx-----
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shiaglc-----nraV-----
-----f-----kxgqxxxxxxxx-----

-----dvagdase-sal lkc-----
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e-----rildrcstillgk-----

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-----xxxxxx
x--x-----xxxxxxxx-----xxxx-----xxxcv ihgtdlk-----

-----dftseqide-----

i l q n h x x i V F A — R T S P Q Q K L I I V E G C q —
 — r q — g a ————— I V A V T G D G V N D S P A L K K A D I G V A M —
 ————— x i a g s d v —————

-----| r r n p x -----xxxxxxx-----

[illegible]

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-----xxxxxxxx
xxs-----
-----y-----NIAFN--GSFC-----
vd---gegy-----gIVIRTGERTVIGqiasmtld-----

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VPQGLPTTvTTELTIIAR-RMakkn-----

-----vFLK-KLEKIDSVGATTIASDKTG-----
-----TLTKNCMTVt-----dlwynnsyn-----

-----xxxxxxxxxxx
xxxxxitsnpaqxxxxxxx-----
-----dl
lsvvcvc---nkar-----
-----ixxxvxnxxxxxxxxxxxxxxxxxxxxxxxxxxxx

-----tignpse--vallry-----
-----asamxxakelxx-----

-----sfqvveipfnsvrkxhlil-----

-----xxxxxxxxxxxx--xxxxxxxx--
-i-----k-----
-----gap
e-----vlikncstmninge-----

skeldlkrmedf-neayeaf-gde-gcrvlgFAQKkf-----
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YMTGDHKSTATA|ARQ|GM-----id-xe-----

-----xxxxxx
x-----xxxxxxxxxxxx-----xavitgselp-----
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ixtylfmsif--isigvcay|xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xeqqmyx-----
an---qaaaafhislvlgqafh-lwmc|tr--rvsifx-----hgxgnivaifaviid
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-----elrklg-----

-----irkypxxxxxxxx-----

w

>hsall_l1c04 NP_653300.1

m

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XX-----

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dhkltleelst

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-pewvkfckq-l-----

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mesfkn--mv-----

-----pqq-alv-----
-----irg-----ge--kmq-----i
n-----
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-----GDRVPADLRLlsa-----

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xxt-----
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VPEGLLATvTVCLTLTAK-RMarkn-----

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ariaglc-----nrad-----
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attgdase--sal l kf--
ieqsyss--vaemxx--
knpkvaeipfnstnkxqms i--
xxxxxxx--xxxxxxx--
m--k--gap
e--rilefcstfl lngq--
eysmndemkeaf--qnaylel--ggl--gervLGFCFLnl--
xxxxxxgfpfntdeinxpmdnlcfVGLISMIDPPRAAVPDAVSKCRSag--IKV
IMVTGDHPITAKAIAKGVGI--i sexxe--
xxxxxx
x--x--xxxxxxxx--xxxx--xxxivvhgae l k--
diqskqldq--
ilqnhxxiVFA--RTSPQQKL I IVEGCq--
r l--ga--VVAVTGDGVNDSPALKKADIGIAM--
xisgsdv--
SKQAADMILLd--DNFASIVtgVEEGRLIFDNLKKS I--M

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXXXX
dhklsnrelee-----

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aygx-----xxxxks--aslnnvylgcv
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mssfkn--mi-----

-----pqq-alv-----
-----ird-----se--kkt-----i
p-----
-----seqLVGDIVEVkg-----
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-----XXXXXXXX
xxt-----
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skiitlc-----nrae-----
-----f--kxgqxxxxxxxx-----

-----avigdase--talIkf-----
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ew----tgytaffvgilvqqiad-liirktrxxsifqq-----glxrnkviwvgitsq
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-----evrklf-----

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y
>hsall_IIC06 NP_000695.2
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-----agg|qc|mwvaa--aici|
afax-----xxxxxd|---tddn|ylaia
liav-v-----vvtgcfgyyqe-----fk-----st-----ni
iasfkn-lv-----
-----pqq-atv-----
-----ird-----gd-kfq-----i
n-----
-----adqLVVGDLEVEMkg-----
-----GDRVPADIRILaa-----

-----q--gckVDNSSLTGESEPQTRsp-

-----xxxxxxx
xxt-----
-----r-----NIAFF--STMC-----
le---gtvq-----gLVVNTGDRTIIGraslasg-----

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VPEGLLATvTVCLSLTAK-RLaskn-----

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-----TLTQNRMTVs-----hlwfdnhih-----

-----xxxxx--exx-
xxxxxdqssetwx-----
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crvltlc---nraa-----
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-----setlgn--amgyxx-----

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elpldeqwreaf-qtayls|-gg|-gervLGFCQLy|-----
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-----xxxxxx
x--x-----xxxxxxx-----xxx-----xxxcv ingmq|k-----

-----dmdpse|ve-----

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elctdifpsvslayekae-sd-----imhlrpr--nxkrdr|vnep|
axysyfqigai--qsfagftdyfxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xgqrl yx-----
qy---tcytvffisievcqiad-vlirktrxxsafqq-----gfxrnkilviaivfq
vcigcflc--ycxxmpn-----ifnfmpi-----
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-----eirklg-----

-----vrccpx-----xxxxxxx-----

y

>cneII_ID01 XP_566813.1

m

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

phtalsgkile

alg sdaasgsdee

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-----gtmdwisggv
iaal-v-----iInsvgayte-----wq-----ae---kt
vasles--vg-----

-----apq-atv-----
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p-----
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----GDIVPADGRILdg-----

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xxr-----
-----i-----CMVFS--GSQI-----
tk---grar-----vVITSTGMGTEIGkiaqales-----

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xxxxxxxxxxxxxx-----dl
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-----lxxvxqdxxx-----

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v

>anill_IID01 EAA64748.1

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-svvki-----
-----lvlllam--avsf-
-----giqswieggv
isav-i-----ilnivvgffqe-----ya-----ae--kt
meslhs--ls-----

-----spt-gtv-----
-----srg-----ge--tfs-----v
p-----
----saeIVPGDMVELrt-----
----GDTVPAIDIRLVea-----

-----v--nfeTDEALLTGESLPVQKec-

-----XXXXXXXXXXXX
xxr-----
-----|-----NLAYS--SSTV-----
tr--grar-----gVVNTGMATEIGsiaaalra-----
-----XXXXXXXXXXXX
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxgvnvgtp|qrklslailfgvavlfaiivm
-aanlfs-----ndnevi|yaVGTGLSM
IPACLVVVITITMAVGTK-RMvern-----

-----vIVR-KLDSLEALGAVTNICSDKTG-----
-----TLTQGKMVVK-----kawipsrgt-----

-----xxxxxxxxxxxxnxxx
xxxxxtp|spvdxxxxxxxxxxxxxxxxxxxxxxxxx-----
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ldvasma-----nlsh-----
-----vxxxexgdx-----

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xxx-----tkgsxx-----

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-----xxxxxxxx-----
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-----gav
e-----rivdacttavwdnsxx-----

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-----xqagsdv-----

-----AKDASDIILTd-DNFASILnaVEEGRRIFDNIQKFV-----L
hll-sen-i-aqactlliglafkdxxx-----kxxfplapveilwi
imitsgmpdmglgmevaa-pd-----imdrppq-----skqgiftwei
i-vdilvygfw--taalclsafsxvxxxxxx-----xxxxx
xgcnrxxxxxxxxxxxxx-----
atxxxxltwfaflawemvnrl-sffrmqpxxkkyftxxxx--dvxrnkflfwsimag
wittfpil--yixxInt-----vvfkh-----
-----tgiswe--wg--ivfveaalffax-----
-----xeawkwa-----

-----krvyyxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxx-----

g
>anill_IID02 EAA58171.1
m-----

-----XXXXXXXXXXXXXXXXXXXX
ahtlspdeilr-----
-----elk-----vnseegltaae-----
-----akkrlelfgpneleggegv-----
-slakiiirq-i-----
-----anammlvliiam-avsf-
-----gieswieggv-----
igav-i-----glnivvgvyqd-----ya-----ae-----kt
mdslrn-ls-----
-----spt-gva-----
-----trd-----gk-tnt-----i
p-----
-----ateIVPGDMIELkv-----
-----GDTVPAADVRLVda-----

-----m--nfeTDEALLTGESLPVQKev--

-----XXXXXXXXXXXXX-----

-----NIAYS--SSTV-----
tr---grar-----gVVIGTGMKTEIGaiaaIha-----
-----XXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXginvgtplqrklslalIfgiavvfaivvm
-ganemr-----ndkevi iyaVATGLAM
IPACLVVVITITMAVGTK-QMverh-----

-----vIVR-RLDSLEALGAVTNICSDKTG-----
-----TLTQGKMVAk-----rawipsIgt-----

-----XXXXXXXXXXdxxx
xxxxxIpdppvXXXXXXXXXXXXXXXXX-XXXXXXXXX-----
-----dy
Invasma---nIav-----
-----vxxxexnex-----

-----qargeptd--iaiqvf---XXXXXXX
xxx-----tkgexx-----

-----iwrqkaeypfdstvk-kmsvxxxxx-----

-----XXXXXXXXXX-----
-t-----k-----
-----gav
e-----rvidsettilwtrnxx-----

v

>anill_IID03 EAA61850.1

m

xx

XX

XXXXXXXXXXXX

ahilspsslsa

llkvdhqhsnee

assrlardgpnrvremeg

svwkillrqv

-----snsltlilvivm-gvsf-
-----gindyieggv
vtav-i-----lInivvgfvqd-----yr-----ae---kd
iIsIqr--Is-----

-----api-ckv-----
-----lrd-----gr--vap-----i
k-----
-----aesLVGDIVLLav-----
-----GDIVPADLRLFdg-----

-----m--nasMDEALLTGESLPVAKtp-

-----xxxxxxxxxxxx
xxr-----
-----t-----NMAYS--GCST-----
tq--grat-----gVVTATGMNTEVGkiaqllqd-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxlglvgtplqvklskfalllfaIaiIivf
-svniwd-----iqgevlIyglCVAVAV
VPESLIAVITITVAVGTK-AMakgn-----

-----vIVR-KLQCLEAVGGVTN|CSDKTG-----
-----TLTQGKMVAr-----tawipdtgi-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxx-exxx
xxxxxdasn-----
-----tf
italslc---nlst-----
-----vxxrxgsxxxxxxxxxxxxxx-----

-----tavgepte--valrvf----xxxxxxx
xxxxxxx-----

-----glqlhteftfdssvk-kmtv---x-----

-----xxxxxx-----xxxxxx-----
-s-----k-----
-----gap
e-----alip-----

sldiideekevi-qdtaerl--age---glrvLCIAYKks-----
-----xxddesqissrnxaesnrfAGLIGLYDPPRLETAAVRKCQMag-ITV
HMLTGDHIRTAMAIASEVGI-----|---d-----

-----xxxxxxxxlvmtakefd-----

-----r lsdad idk-----

ieqlp--IVIA--RCSPTTKVRMVEAMh-----
---rr--ga-----FCVMTGDGVNDSPALKRADVGIAM--
-----xkngsdv-----

-----AKEAADMVLtd-DNFASIVkaVEEGRRLLFDNIQKVI-----L

-----XXXXXXXXXX-----
pfl|p|teevaa-----
-----t|n-----tdvdkg|tsaq-----
-----vqk|qeeyppne|dagga i-----
-pwyti|flkqxf-----
-----namv|v|i|fam--alsf-----
-----gisdyie|gav-----
laav-i-----v|n|nsigfvqe-----yr-----ae-----kk-----
mdalra--ls-----
-----sps-at i-----
----lrd-----gk--tqv-----i-----
p-----
---naeVVPGDICILkt-----
---GDTVPADLRLFev-----
-----m--n|sCDEQSLTGESMPVDK i v-----
-----XXXXXXXXXXXXXXXXXXXX-----
-----XXXXXXXX-----
xxr-----
-----v-----NIAYA--TTVV-----
rk---grgr-----g|VVETGMQTEVGkiaastrk-----
-----XXXXXX-----
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXg|tegtplqrklasleyv|fgcalilavivf-----
-gvnrfq-----isheiviyal|STGIAI-----
|PESLVAVIT|TMVQATR-VMrkan-----

-----vVVR-DLSALEALGGVTNICSDDTG-----
-----TLTQGAMIVk-----kvwlpatri-----

-----xxxxxxxxxxdxxx
xxxxxxvekkpgqxx-
-----mf
llagalc-----nlat-----
-----vxxxexkqxx-----

-----qttgepte--ialqv-----xxxxxxx
-----kvlex-----

-----gwkqvsefpdstik-rmsvxxxx-----

-----xxxxxxxxxxxxxxxx-----
-t-----k-----
-----gav
e-----riidlcshlggdd-----

lqemndaaketi-leqmndf-asq-----gqrvLAIAyRkw-----xxxx
xxxxxxxxxxxxxxxxpeksdenvrsexiesgltilGLVGIYDPPRKETTPAIRECSSag-IKV
HMLTGDHPATAAAIAKEVGI-----lpfxg-----

-----xxxxxxxxxavqkatdfd-----

-----kmtdaeida-----

lpelp--IVIA--RCAPDTKTRMIEALr-----
--rr--sa-----FMAMTGDGVNDAPSLSNADVGIAM--
-----gsgsdv-----

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hll--tsn-v-gevilliaaglfgdxxx-----txxfpisplqilwi
nmltssfpafglgrekan-ae-----imrkpph--s-tkrgvftnqi
l-vdmlvygfi--mgvctlmtfvxxxxxxx-----xxxxx
xdcnttxxxxxxxxxxxxxxxxx-----
ae----ltwlilisawefkslrr-smfrlnpxxtskfpxxx---dixenrflfwsuvia
ffsvflav--yixxInt-----nvfkh-----
-----rgitwe--wg--lvfgglvvfvvx-----
-----xeawkfi-----

-----krkfnxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx-----

d
>mgrII_IID02 XP_360418.1
m-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 ahalet eqvve-----
 -----elq-----anpedgltpae-----
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 -kpwnil iaq-i-----
 -----anamtlvllam--aasf-
 -----giesiegc v
 vaav-i-----llnitvgfqe-----lk-----aa--kt
 mds lrs--ls-----
 -----spt-aqa-----
 -----vrd-----gr--nit-----v
 p-----
 ---tve lVPGDMVELkt-----
 ---GDTIPADVRIlea-----

-----v--nfeTNEALLTGESLPVRKea-

-----xxxxxxxx
xxr-----
-----|-----NVAYS--SSTV-----
tk---grar-----gIVFATGMYTEIGqiaaIrg-----
-----xxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxgvnvgtpIqrklakIavvIfgtaiicaIivI
-gandfd-----tsqevviyaVATGVAM
LPASLVVVITITMAAGTK-RMvqrh-----

-----vIVR-KLKSLEALGGVTNICSDKTG-----
-----TLTQGNMIVr-----kawi pghgt-----

-----xxxxxxxxnxxx
xxxxxraeqprdxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----dy
Inlasla---nlat-----
-----vxxxkxgex-----

-----hargdpte--iaiqvf---xxxxxxx
xx-----Isgexx-----

-----rwnqvaefpfdsdvk-kmsvxxxxx-----

-----xxxxxxxx-----
-t-----k-----
-----gat
e-----rvipscrkiqmgde-----

i ipftdeherdi-tanlevl--akl---glrvLSLASKrn-----
-----xxxvdnhdnldr kxfehelvfQGLIGIYDPPRPESAPSVKKFHQag-VSV
HMLTGDHPETARAIALEVGI-----lpsxxg-----

-----xxxxxxxxxmvmaasdfd-----

-----kl sdddr-----

lprlp--IVVA--RCAPQTKVRMIEALh-----
---rr--nr-----FVAMTGDGVNDSPSLKRADVGIAM--
-----xegsdv-----

-----AKEASDI ILTd-DNFASILnaVEEGRRMFDNIQKFV-----L
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imitsglpdmalgfeiaa-pd-----vmdrp-ph--d-mkagiftwel
v-admfayglw--taalclaaflxxxxxx-----xxxxx
xncnnsxxxxxxxxxxxxx-----
atxxxxltwfaflawemlhmrr-sffrmqpxxtkyltxxxx--dvxrnklffsivag
fvtifpll--yixxint-----vvfkh-----
-----agiswe--wg--ivfvaslffix-----
-----xeawkwa-----

-----krvwiXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXX-----

[illegible]

V
>osal|||_|||A01 NP_001048395.1

[illegible]

-----wnplswvmeaaa--imaiv
lang-----g--g-----rpp----dwqdfvgiv
v--l-l-----vinstisfiee-----nn-----ag--na
aaalma--gl-----

-----apk-tkv-----
-----lrd-----gk--wqe-----q
d-----
----asiLVPGDIIISikl-----
----GDIIIPADARLLeg-----

-----d--plkVDQAALTGESMPVNXhx-

-----x-----

-----QGVFS--GSTV-----
kq--geie-----aVVIATGVHTFFGkaahlvds-----

-----tnnighfqlvltaignfciiisigvgmiiei
-ivmypiqr-----ayrdgidnILVLLIGG
IPIAMPTVISVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLTVdktli-----evygrgldk-----

-----ds
vlljaar-----asr-----

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-----sgrawnn-innktafvnkndygkgereaqwat
aqrtlhglngsstxxx-----
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-----lfnkdtgyrelseiaeqakraevarlxxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----
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m

-----xxxxana-----

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-----hik-----ct-regltsev-----

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-skllkflgf-m-----
-----wnplswvmeaaa--imaia
lahg-----gxxxxg-----krm--xxdyhdfvgiv
l--l-l-----finstisfme-----nn-----ag--na
aaalma--rl-----

-----apk-akv-----
-----lrd-----gt--wde-----l
d-----
-----asILVPGDIISVkl-----
-----GDIIPADARLLeg-----

-----d--plkIDQSALTGESLPVTKhx-----

-----x-----

-----DGIYS--GSTC-----
kq--geie-----aVVIATGIHTFFGkaahIves-----

-----tthvghfqkvltsignfcicsiaagmvieI
-lvmyavher-----kyrqivdnILVLLIGG
IPIAMPTVIVTMAIGSH-KLaqg-----

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-----dd
vvlmaar-----asr-----

-----lenqdaid--faivsm-----
-----lpd--pkeara-----

-----giqevhflpfnpdk-rtal-----

-----t-----yl da-e-gkmhrvsk-----
-----gap
e-----qi l nla-----

-----snkceierkv-hhvignf--aer-----glrsLAVAYQev-----
-----pegtkespggpwqfVGLLPLFDPPRHDSAETIRRALDl g-VSV
KMITGDQLAIGKETGRRLLGM-----

-----gtnmypsssl l gdrkdg-----

-----diavlpvde-----

lieqa--dGFA--GVFPEHKYEIVQRLq-----
--ar--kh-----ICGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARSASDIVLTe-PGLSVIIsaVLTsRAIFQRMKNYT-----I
yav-sitvr-ivlgflllacfwkf-----dfppflvlvi
ailndgti-----mtiskdkvkpsypdswkltei
f-atgvii gaylavttvlffwaayktqffv-----xxxxvdt
lxxxxxxxxxxxxxxxxx-----
ek----lasavylqvstisqali-fvtrsrgwsflerp-----glllmaafviaqlia
tvlaaiatwevasirgigwrw-----
-----agaiwv--yn--ivvyllldpmk-----
-----favrygl-----

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eqrtlhglsqaas-----

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xxxxxxxxxx-----

v
>osalII_IIIA03 NP_001049185.1

m-----

xxxxxxxxxxxxxxxx
 xxxxxxxxxxxxxxxx | g
 xxxxxxxx xdl
 enlpledvfe
 qln ts-qsglssad
 aaerlk|fganr|e-ekre
 nkiikflsf-m
 wnp|swvmeaaa-vma|v
 lang g s qgt dwedflgiv
 c-l-l i instisfiee nn ag da
 aaalma-r|
 alk-tkv
 lrd eq wqe
 d
 astLVPGDII|Srl
 GDIVPADARLLeg

-----d--plkIDQSALTGESLPVTKrx-----

-----x-----

-----DIVFT--GSTC-----
kh---geie-----aVVIATGIHSFFGkaahlvds-----

-----tevvghfqkvltsignfcicsiaigaivev
-iimfpiqhr-----syrdginnvLVLLIGG
IPIAMPTVISVTLAIGSH-HLsqg-----

-----aITK-RMTAIEEMAGMDVLCCKTG-----
-----TLTLNHLTVdknli-----evfsremdr-----

-----em
iillaar---asr-----

-----venqdaid--maiinm-----
-----lad--pkears-----

-----sitevhflpfnpvdk-rtai-----

-t---yvds-d-gnwfrvsk-----
-----gap
exxxxxxxxxxxxxxxxxxxxxqilslc-----

--ynkddisekv-qliidrf--aer---glrsLAVAYQev-----
-----pekskhghggpwvfCGLLPLFDPPRHDSADTIRRALDl g-VCV
KMITGDHLAIAKETGRR LGM-----

-----gtnmypsaslfgrhgdg-----

-----ggaavpvee-----

lveka--dGFA--GVFPEHKYEIVRMlq-----
--ggxxh-----VCGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARGAADIVLT e-PGLSVIVsaVLTSRAIFQRMKNY Txxxxxxl
yav-sitir-ivigfvllasiwey-----dfppfmvlii
aiIndgti-----mtiskdrvkpsspdsowlnei
f-aagvvigtyla lvtvlfywtvtrttffe-----vrs
lxxx-----x-----
de---issamylqvsii sqali-fvtrs qgl sflerp-----gallicafilaqlva
tliavyatisfasisaigwgw-----
-----agviwl---ys--lvfyapldlik-----
-----iavrytl-----

-----sgeawnllfdrkaafasrrdygnerrpetrw
prshhhhhqqr raxxx-----

-----xl-----lssgwrptriaerakrraeiarr-----

-

>osalII_IIIA04 NP_001050947.1

m-----

-----x-----xxkgg-----

-----xxxxxxx-----xdl-----

-enipieevfq-----

-----nlk-----cc-rqgl tsee-----

-----aqlrlqlfgpnkle-ekke-----

-skflkflgf-m-----


```
-----sgkawdlvieqriaftrkkgfgeereikwah
ahrtlhglqppdax-----
-----
-----pfpektgyseInqmaeeakrraeiar|xxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----
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[illegible]

-----gg-----

-----xxxxxxx-----xdl-----
-enipieevfe-----

-----q|k-----ct-reg|ssee-----

-----gnrriemfgpnkle-ekke-----
-skilkflgf-m-----
-----wnplswvmemaa--imaia
lang-----g-----g-----kpp-----dwedfvgi
v--l-l-----vinstisfiee-----nn-----ag-----na
aaalma--nl-----

-----apk-tkv-----
-----lrd-----gr--wge-----q
e-----
-----aaiLVPGDIIISIkI-----
-----GDIVPADARLLeg-----

-----d--plkIDQSALTGESLPVTKn-----

-----x-----
-----x-----DEVFS--GSTC-----
kq--geie-----aVVIATGVHTFFGkaahlvds-----

-----tnqvghfqvtltaignfcicsiavgiviei
-ivmfpiqhr-----ayrsgien|LVLLIGG
IPIAMPTV|SVTMAIGSH-KLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLSVdknlv-----evftkgvdk-----

-----dh
vlllaar-----asr-----

-----tenqdaid--aamvgm-----
-----lad--pkeara-----

-----girevhflpfnpvdk-rtal-----

-t-----yida-d-gnwhrask-----
-----gap
e-----qiltlc-----

--nckedvkrkv-havidky--aer----glrsLAVARQev-----
-----pekskesaggpwqfVGLLPLFDPPRHDSAETIRKALHIg-VNV
KMITGDQLAIGKETGRRLLGM-----

-----gtnmypssallgqnkda-----

-----slealpvde-----

lieka--dGFA--GVFPEHKYEIVKRLq-----
--ek--kh-----IVGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

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yav-sitir-ivlgflliali wky-----dfspfmvli i
aiIndgti-----mtiskdrv kpslpdswkl kei
f-atgivlgsylalmtviffwamhkt dfft-----xxxxvrs
ixxx-----x-----
he---mmsalylqvsivsqali-fvtrsrswsfierp-----glllvtafmlaqlva
tflavyanwgfarikgigwgw-----
-----agviwl---ys--ivfyfpldifk-----
-----ffirfvl-----

-----sgrawdnl lenkiafttkkdygreerea qwat
aqrtlhg lqppevxxx-----

-----xlfndkssyrelseiaeqakrraeiarlxxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----

v
>osalII_IIIA06 NP_001055186.1
|-----

-----xxxxxxxhvg-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxslxxxxx--xxx
xesipiqevfa-----

-----vlk-----ss-pqgltsad-----

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-skllklflgf-m-----wnplswvmeaaa--imaia
lang----g---g-----rpp----dwqdfvgiv
t--l-l-----finstisfiee-----nn-----ag--na
aaalma-sl-----apq-tkl-----
-----lrd-----gk-wse-q
d-----aiLVPGDIIISikI-----GDIIPADARLMeg-----

-----d--pIkIDQSALTGESLPVNMx-----

-----x-----

-----DSIYS--GSTC-----

kq---geie-----aVVIATGVHTFFGkaahlvds-----

-----tnnvghfqkvltaignfcicsiaagmliei

-ivmypiqr-----qyrdgidnILVLLIGG

IPIAMPTV|SVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----

-----TLTLNKLTvdknmi-----epfvkdldk-----

-----da

ivlyaar---asr-----

-----tenqdaid--asivgm-----

-----lad--pseara-----

-----giqevhfmpfnpvdk-rtai-----

-t-----yidtxd-gswhrisk-----

-----gap

e-----qiieic-----

--rlrddvsrrv-haiidkf--adr---glrsLAVARQkv-----
-----pegskdapgtpwqfLAVLPLFDPPRHDSSETIRRALNlg-VNV
KMITGDQLAIGKETGRR LGM-----

-----gtmypsssl--kdg-----

-----dtgglpvde-----

lieka--dGFA--GVFPEHKYEIVRRLq-----
--er--kh-----ICGMTGDGVNDAPALKKADIGIAV--
-----xxxxxx-----

-----ARGASDIVLTe-PGLSVIIsaVLTSRAIFQRMKNYT-----I
yav-sitir-vvlglfllaliwrf-----dfapfmvlii
aiIndgti-----mtiskdrvkp sp lpdawrlqi
f-atgivilgtylalatvlf wvrdtdfftxxxxxxxxxxxxxxxxxxxxxxxxxvhp
ixxx-----x-----
ee---lmaavylqvsii sqali-fvtrarswffverp-----glllvgafliaqlma
tliavyanwpfakmkgigsw-----
-----gmviwl---fs--ivtffpldifk-----
-----fairyfl-----

-----sgkawnnafdnktafaneldygkskreaqwai
aqrslhglqqaetxxx-----

-----|fddnkdy|else|aeqakrrae|ar|xxxxxxxxxxxxxxxxxxxx

xxxxx-xxxx-----

v

>osal|||_|||A07 NP_001056980.1

m-----

-----xxs|s-----

-----xxxxxxxx-----

-----xdl-----

-skapvaevfq-----

-----klk-----

-----cd-rkg|tgae-----

-----gesr|r|ygpnk|e-ekke-----

-sk|lkf|gf-m-----

-----wnplswvmeiaa--imaiv
lang-----g-----g-----rpp-----dwqdfvgiv
s--l-l-----iinstisyie-----an-----ag----da
aaalma--gl-----

-----apk-tkl-----
-----lrd-----gr--wee-----q
e-----
----aaLVPGDIISkl-----
----GDIPADARLLeg-----

-----d--plkIDQSALTGESLPVNKhx-

-----x-----

-----QEVFS--GSTV-----
kq--geie-----aVVIATGVRTFFGkaahlvds-----
-----tnnvghfqqvltaignfciiisigamavev
-lvmypiqhr-----ayrdgidnLVLLIGG
IPIAMPTVISVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLTVdktli-----evcsgvdk-----

-----dm
vllyaar-----asr-----

-----venqdaid--tcivnm-----

-----lidd--pkeara-----

-----giqevhflpfnpvdk-rtai-----

-t-----yidg-n-gdwhrvsk-----

-----gap

e-----qiieic-----

--nmaadaekkv-halidsy--adr---glrsLGVSyQqv-----

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KMITGDQLAIAKETGRRLGm-----

-----gtmypoxttllgd-kns-----

-----qvnglpide-----

l i e r a -- d G F A -- G V F P E H K Y E I V K R L q -----

--em--sh-----ICGMTGDGVNDAPALKKADIGIAV--

-----xxxxxx-----

-----ARSASDIVLT e - P G L S V I V s a V L T S R A I F Q R M K N Y T ----- I

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>osal||_|||A08 NP_001059093.1
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m-----

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-skflkflgf-m-----
-----wnplswvmeaaa--imaia
lang-----g-----g-----kpp-----dwqdfvgii
t--l-l-----iinstisfieee-----nn-----ag-----na
aaalma--rl-----

-----apk-akv-----
-----lrn-----gr--wse-----e
e-----
-----aaiLVPGDIIsvkl-----
-----GDIIPADARLLeg-----

-----d-plkIDQSALTGESLPVTkgx-----

-----x-----

-----DGVYS--GSTC-----
kq-----geie-----aVVIATGVHTFFGkaahlvds-----

-----tnqvghfqkvltaignfcicsiaigmvvei
-ivmypiqr-----dyrpgidnILVLLIGG
IPIAMPTVIVTMAIGSH-RLaqqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLTVdksli-----evfqrqvda-----

-----dt
vilmaar-----asr-----

-----tenqdaid--ativgm-----
-----lad--pkeara-----

-----giqevhflpfnpdk-rtal-----

-t-----yidg-e-gkmhrvsk-----
-----gap
e-----qilnla-----

--hnkteierrv-ravidkf--aer----glrsLGVAYQqv-----
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-----sivalpvde-----

lieka--dGFA--GVFPEHKYEIVKRLq-----
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-----xxxxxx-----

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ai lndgti-----mti skdr vkpsqpds wkl sei
f-atgvvlgsylammtviffwvaykt dffp-----xxxxves
lxxx-----x-----
qdxxxxlasavylqvstisqali-fvtrsrswsfverp-----gfl l v f a f f v a q l i a
tliavyanwgfasikgigw gw-----
-----agviwl-----yn--ivfylpldi ik-----
-----fliryal-----

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aqrtihglqpaatxx-----

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xxxxx-xxxx-----

v
>osal l l l l l A10 NP_001067382.1

m-----

-----x-----xxegn

-----xxxxxxx-----xdl-----

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-----aqqr|eifgpnkle-ekee-----

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lang-----g-----g-----kpp-----dwqdfvgii

t--l-l-----vinstisfiee-----nn-----ag-----na

aaalma--rl-----

-----apk-akv-----

-----lrd-----gr--wte-----e

e-

---aa|LVPGDIVS|kl-----

---GDI|PADARLLeg-----

-----d--pIkIDQSALTGESLPVTKgx-----

-----x-----

-----DGVYS--GSTV-----

kq---geie-----aIVIATGVHTFFGkaahlvds-----

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-ivmypiqr-----ayrpgidnILVLLIGG

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-----aITK-RMTAIEEMAGMDVLCSDKTG-----

-----TLTLNKLTvdknli-----dvfergitq-----

-----dq

vilmaar---asr-----

-----tenqdaid--taivgm-----

-----lad--pkeara-----

-----giqevhflpfnpdk-rtal-----

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-----gap

e-----qilhla-----

--hnkpeierrv-havidkf--aer---glrsLAVAYQev-----
-----pegtkespggpwhfVGLMPLFDPPRHDSAETIRRALNlg-VNV
KMITGDQLAIGKETGRRLGM-----

-----gtnmypsa||gqnkde-----

-----siaalpvd-----

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yav-sitir-ivlgfml|aliwvf-----dfppfmvlii
aiIndgti-----mtiskdrvkp|pds|swklaei
f-ttgvvlggylamtviffwaaykt|dfp-----xxxxves
lxxx-----x-----
qdxxxxlasavylqvstisqali-fvtrsrswsfverp-----gfllvfaf|vaqlia
tliavyadwaftsikgigwgw-----
-----agivwl---yn--lifyfp|diik-----
-----fliryal-----

-----sgkawdlvieqriaftrk|kdfgkeere|kwah
aqrtlhg|qppdax-----

qgpil yvmeaaa--ilafa
l-----rdwidagv
ixxi-l-----llnaivgwyqe-----kq-----aa----dv
vaslkg--di-----

amk-arv-----
vrn-----gs-eqe-----i
r-----
areLVPGDIVIlee-----
GHVVPGDARLIcd-----xxxxxxxxxxxxxxxxxxx-----

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxa--ivaIDQSAITGESLAVDKyx-

x-----DTVYY--TTGC-----
kr--gkay-----gIVTHGAQASFGktaslvqg-----

aqdqghfkaimnsigsallvlvvvfilaaw
-iggfyrhlaxxxxxx-----ssvnllhyvLILLIIIG
VPVGLPVVtTTTLAVGAA-YLakek-----

aIVQ-KLTAIESLAGVDILCSDKTG-----
TLTANQLSVr-----epfvmegvdxx-----

wm
mavaala-----sshx-----

yrixlc lhlxiylvtsmiainetv-----rvdlivf
lal fadlaxxxxxxxxxxxxxx-----vewqlpk-----iwiisi
vxgtllaigtwilrgtmwle-----

ngxxxxhygsiqeillflqisltextwlifvtr-----gxxxxxxqligaifgvdilasl
fagfgwfsgglgepaipaslaaaaaaaaaaaaa-----
-----ivlvwi-----ys-----iaviivigivy-----
-----yvmtgwk-----

-----rlddigrkkrsaqdtmmenilthlskvavehe
idgrgghryylatxxx-----

-----xeee-----

e
>cnelIII_IIIA01 XP_571736.1
m-----

-----XXXXXXXXXX

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-----wf
mavavla-----sshx-----

-----vlgldpid-kvtivg-----
-----xxxxpka-qemlkg-----

-----gwkthkftpfdpvsk-ritaxxxxxxxxx-----

-----a-----k-----
-----gap
n-----ailkltx-----

-----fdpdtvsay-raqsqqf-asr-----gfrsLGVAVKed-----
-----gkdweILGMLCMFDPPRIDTAKTIGEAHDIg-IQV
KMLTGDAVAIAKETCKQLGL-----

-----ktnvydsek-----

xxx-----gmagsdird-----

fveaa--dGFA--EVFPEHKYQVVNLLq-----
--er--gh-----LTAMTGDGVNDAPSLKKADCGI AVxx
xxxx-----

-----ARTAADVVFLd--EGLSTIIItaIKVARQIFHRMKAYI-----I
yrixlcvhlxvylmlsiliineti-----rvdlvvf
laifadvaxxxxxxxxxxxxxx-----vewqlpk-----vwiist
ixglIIaagtwiiratIwid-----

ngxxxxnfgstqeilflevaltexwvifitr laqepgtxxxxxxqlvaavigvdalati
falfgwisgdaphg-----xxxxxxx-----
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tdhngsyrrfastxxx-----

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xxx-----

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[illegible]

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-----x-----

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-----xndqvghlqqvlarigtfcIvsigifvll ei

-lilyadfry-----pyrrgldniLVLLIGG

IPIAMPTVISVTLAVGAQ-QLakhk-----

-----aIVT-RITAIEELAGVTILCSDKTG-----

-----TLTTNKLTldkenv-----kcyskw dv-----

-----eg

vcllaay---asr-----

-----tenqda id--gcvvgt-----

-----lpd--pqqara-----

-----giklIdfkpfnpvdk-rtei-----

-t---yrdexdxgklkratk-----

-----gmt

g-----iieic-----

xxnktneledql-eadvfef--arr---glraLAVAFEdv-----
-----agddpsaegngeIVGLLSIFDPPRSDTKKTIDDAMA|g-VKV
KMVTGDQLAIAKETGRRRLGL-----

-----gdhmypakv|kegpea-----
-----gskhan|de-----

mimda--dGFA--GVFPEHKFEIVKR|q-----
---nl--gh-----LCAMTGDGANDAPALSRANVGIAVxx
xxxx-----

-----ARGAADIVLTe-PGLSTIVha|YGSRVIFQRMRYA-----I
yac-avtir-ivlcfaimaawrf-----dfppfmvlii
av|ndgti-----mt|sl|drvlpsttpdswdlaev
f-sfgvaygvylsastialyatmenttffe-----xxxxvep
|-----

kgxxxxghmviylqvaiisqali-fvtrshgpswterp-----svalmlafclaqlvs
s|iaayadwsfsqvhsvsggw-----
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snrtnf|traanrxxx-----

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a

>anlll_lla01 EAA65724.1

m-----

-----x

XXsgs-----

-ripgmeaqfd-----

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vgpvqfvmegaa--ilai-
 xlr dwdfgv
 ix xl-l-llnatvgfiqe-yq-ag-si
 veelkk-sl
 alk-aiv
 vrd-gr-vtd-i
 d
 ateVVPGDVLKIde
 GTIVPADGRVKtn
 xllqIDQSSVTGESLAVNKc
 x
 x-EVCYA-SSVV
 kr-ghay-IVVTATGDYTFMGktaalvks
 xssnsghftevlnrigatlvlvvltlivvw
 -vssfyrsn-etvtileftLAITMIG
 VPGVLPAAvTTTMAVGAA-YLakrq
 aIVQ-RLSAIESLAGVEVLCSDKTG
 TLTKNKLTLs-dpytvagvdxx
 dl
 mltacla-asrx

-----lkgmdaid--kafika-----
-----xxxxpra--kealsh-----

-----ykiqqfhpfdpvskxvtavxxxxxxxxx-----

xv-----k-----
-----gap
l-----wv|ktvxx-----

xxqipesvekgy-sdkmdef--aqr----gfrsLGVARKpa-----
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KMLTGDAVPIARETSRELGL-----

-----gtnvynsdki-----
-----xxx-----
xxx-----dltgselyn-----

yveaa--dGFA--EVWPQHKYNNVDILq-----
---qr--gy-----LVAMTGDGVNDAPSLKKADTGIAVxx
xxxx-----

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yrixlslhxlxiflglwiaimnesl-----nlqlvvf
iaifadiaxxxxxxxxxxxxxxxx-----vkwnlpk-----lwglsv
ixgivlavgtwialttmnage-----

haxxxxnygrdevlfleisltextwlifitrn--gpfxxxxxxqlaaifvvdivasf
fcyfgwfvvggqtsiva-----
-----ivriwv----fs--lgvfcmggvy-----
-----fllqrsq-----

-----tfddimhfnflqkrdsvsqrvlddlvvalqrr
seqheqssrtaerxxx-----

-----xlwmdklrkeraq-----

c

>anlll_IIIA02 EAA60937.1

m-----

-----xxxx

xxkqk-----

-----kkxxxxxxxxxxxx
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-----wle-----tdx-nglpssq-----

-----ieprkrkgwneItxektn-----
--ffvqfigy-f-----
-----rgpilyvmelav--llaag
l-----rdwidlgv
ixxi-l-----mlnavvgwyqe-----kq-----aa----dv
vaslkg--di-----

-----amk-avv-----
----krd-----gq-eqe-----i
l-----
---areLVTGDIVVlee-----
---GTIVPADVRLlcd-----xxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxxs--lvaVDQSAITGESLAVDKyx--

-----x-----DTCYY--TTGC-----
kr---gkay-----aIVTATAKHSFVGktaalvqg-----

-----aqdqghfkavmdnigtsllvIvmfwilaaw
-iggfyrhIkxxxxxx-----sdntllhwtLILLIG
VPVGLPVVtTTTLAVGAA-YLaeqk-----

-----aIVQ-KLTAIESLAGVDILCSDKTG-----
-----TLTANQLS|r-----epyvnegvdx-----

-----wm
mavaaia-----snhx-----

-----vknldpid-kvtilt-----
-----xxxxpka-reilar-----

-----nwvtekytpfdpvs-k-rittxxxxxxxxxxxx-----

-----a-----k-----
-----gap
k-----ai|amsxxx-----

-----peeaqkf-rekasef-arr-----gfrsLGVAVQke-----
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KMLTGDALAIAKETCKMLAL-----

-----stkvydser|-----

xxx-----glagsaqhd-----

lveka--dGFA--EVFPEHKYQVVEMLq-----
--qr--gh-----LTAMTGDGVNDAPSLKKADCGI AVxx
xxxx-----

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yrixlcihlxlylvtsmiiineti-----kadlivf
ialfadlaxxxxxxxxxxxxxx-----vewqlpk-----iwvisv
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ngxxxxnfgspqpmIflevsItexwlifvtr-----gxxxxxxxqlvgaifvvdvlatl
fcvfgwlagdyvetsppsqsq-----xxxxxxxxxxxxx
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vdangksrytlgaxxx-----

-----xe-----
-----xx-----

e
>ddllll_IIIA01 XP_639363.1
m-----

[illegible]

-----e--qvkIDQSSLTGESLPVTKk--

--x-----

-----x-----DEVYS--GSAM-----

kq---geak-----cVVTATGVNTFFGraanlvqe-----

-----teghghlqvIlrnigIfcisfiaiwvlvel

-lvdfIgydgydxxxxxxx-----grclplInnaLVLLVGG

IPiAMPtVlSVtMAIGAT-QLskkk-----

-----aIVS-RLASIEELAAMDILCSDKTG-----

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-----ed

ivfhafI---acsx-----

-----gedqdaId--kaIsny-----

-----crdxpnvdys-----

-----gneivkhypfnpedkxamgl-----

-v-----xaxgkqfktak-----

-----gap

q-----iilreaxxx-----

-----kqvgeav-ekiei enl-----adr-----gyraLGVSVSyd-----
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KMITGDQLAIAKETARRLGM-----

xhhksvvt dnk

>athIII_IIIA01 NP_179486.1

[illegible]

sg

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q l k c t r e g l t t q e

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- sk i | k f | g f - m -----

-----wnp|swvmeaaa--lmaia
lang-----d---n-----rpp-----dwqdfvgii
c--l-l-----vinstisfieee-----nn-----ag---na
aaalma--gl-----

-----apk-tkv-----
-----lrd-----gk--wse-----q
e-----
-----aaiLVPGDIVSIkl-----
-----GDIIPADARLLeg-----

-----d--p|kVDQSALTGESLPVTKhx--

-----x-----

-----QEVS--GSTC-----
kq---geie-----aVVIATGVHTFFGkaahlvds-----

-----tnqvghfqkv|tsignfcicsiaigiaiei
-vvmypiqhr-----kyrdgidn|LVLLIGG
IPIAMPTV|SVTMA|GSH-RLsqg-----

-----a|TK-RMTA|EEMAGMDVLCSDKTG-----
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-----dq
v||faam---asr-----

-----venqda id--aamvgm-----

-----lad-pkera-----

-----girevhflpfnpvdk-rtal-----

-t-----yids-d-gnwhrvsk-----

-----gap

e-----qildla-----

--narpdlrkkv-lscidky--aer---glrsLAVARQvv-----

-----pektkespggpwe fVGLLPLFDPPRHDSAET IRRALN I g-VNV

-----KM|TGQLA|GKETGRRLGM-----

-----gtnmypsaal|gtdkds-----

-----niasipvee-----

Iieka--dGFA--GVFPEHKYEIVKKLq-----

---er---kh-----IVGMTGDGVNDAPALKKADIGIAV---

-----XXXXXX-----

-----ARGASDIVLT e-PGLSVIIsaVLTsRAIFQRMKNYT-----I

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-----sgkawaslfdnrtafttkkdygigereaqwaq
aqr t l h g l q p k e d x x-----
-----
-----i f p e k g s y r e l s e i a e q a k r r a e i a r l x x x x x x x x x x x x x x x x
xxxxx-xxxx-----
```

[illegible]

-----ss-----

-----xxxxxxx-----xdl-----
-ekipieevfq-----

-----q|k-----cs-reg|ttqe-----

-----gedriqifgpnkle-ekke-----
-skllkflgf-m-----
-----wnplswvmemaa--imaia
lang-----d-----g-----rpp-----dwqdfvgii
c--l-l-----vinstisfieee-----nn-----ag-----na
aaalma-gl-----

-----apk-tkv-----
-----lrd-----gk-wse-----q
e-----
-----aaiLVPGDIVSIkl-----
-----GDIIPADARLLeg-----

-----d-plkVDQSALTGESLPVTKhx-----

-----x-----

-----QEVSFSGSTC-----
kq-----geie-----aVVIATGVHTFFGkaahlvds-----

-----tnqvghfqkvltaignfcicsiaigmviei
-ivmypiqr-----kyrdgidn|LVLLIGG
IPIAMPTV|SVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLSVdknlv-----evfckgvek-----

-----dq
vllfaam-----asr-----

-----venqda id--aamvgm-----
-----lad--pkeara-----

-----girevhflpfnpvdk-rtal-----

-----t-----yidg-s-gnwhrvsk-----
-----gap
e-----qilela-----

-----kasndlskkv-lsiidky-aer-----glrsLAVARQvv-----
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-----gtnmypssallgthkda-----

-----nlasipvee-----

lieka--dGFA--GVFPEHKYEIVKKLq-----
--er--kh-----IVGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARGASDIVLTe-PGLSVIIsaVLTSRAIFQRMKNYT-----I
yav-sitir-ivfgfmlialiwe f-----dfsafmvlii
aiIndgti-----mtiskdrv kpsptpds wklkei
f-atgvvl ggyqaimtviffwaahkt dffs-----xxxxvrs
ixxx-----x-----
he----lmgavylqvsii sqali-fvtrsrswsfverp-----gal lmi afli aqlia
tliavyanwefakirgigw gw-----
-----agviwl----ys--ivtyfp ldvfk-----
-----fair yil-----

-----sgkawlnl fenktaftmkkdygkeereaqwal
aqrtlhglqpkeaxx-----

-----ifpekgsyrelseiaeqakrraeiarlxxxxxxxxxxxxxxxxxxxx
xxxxx--xxx-----

v
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m-----

-----asg-----

-----xxxxxxx-----xdl-----

-ekipieevfq-----

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-sk|lkflgf-m-----

-----wnp|swvmeaaa--imaia

lang-----g-----g-----kpp-----dwqdfvgiv

c--l--l-----vinstisfvee-----nn-----ag-----na

aaalma--gl-----

-----apk--tkv-----

-----lrd-----gk--wse-----q

e-----

---asiLVPGDIVSIkl-----

---GDIIPADARLLeg-----

-----d--pIkVDQSALTGESLPATKgx-----

-----x-----

-----EEVFS--GSTC-----

kq---geie-----aVVIATGVHTFFGkaahlvds-----

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-vvmypiqrr-----hyrdgidnILVLLIGG

IPIAMPTVISVTMAIGSH-KLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----

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-----de

vlifaar---asr-----

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-t---fids-n-gnwhrvsk-----

-----gap

e-----qildlc-----

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-----gsnmypsssl lgkhkde-----

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lieka--dGFA--GVFPEHKYEIVKKLq-----
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-----ARGASDIVLT e-PGLSVllsaVLTsRAIFQRMKNYT-----I
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ailndgti-----mtiskdrvksptpdswklkei
f-atgvvlggymaimtvvffwaaykt dffp-----xxxxvrd
lxxx-----x-----
he---mmsalylqvsivsqali-fvtrsrswsfterp-----gyflliafwvaqlia
taiavygnwefarikgigwgw-----
-----agviwl---ys--ivfyfpldimk-----
-----fairyii-----

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xxxxx-xxx-----

v

>athIII_IIIA04 NP_190378.2

m-----

-----xxxxx-xxrev-----

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-----xdl-----

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-----nlr-----

-----cs-keglttqa-----

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-skflkflgf-m-----

lang g g wnp l swvmeaaa imaia
t l l vinstisfee nn ag na
aaalma r l
apk akv
lrd gr wge q
d
aaiLVPGDIISIkI
GDIVPADARLLeg
d pl kIDQSALTGESLPVTKsx
x
DGVYS GSTC
kq geie aVVIATGVHTFFGkaah l vdt
tnqighfqqv ltaignfcicsiavgmliei
vvmypiqhr ayrpgidn lLVLLIGG
IPIAMPTVISVTMAIGSH RLsqqg
a lTK RMTAIEEMAGMDVLCSDKTG
TLTLNKLTVdkn l i evfmkgvda
dt
vv lmaar asr

-----lenqdaid--aaivgm-----

-----lad--pkdara-----

-----giqevhflpfnpdk-rtal-----

-t-----yidn-e-gnthrvsk-----

-----gap

e-----qilnla-----

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-----sivalpvde-----

lieka--dGFA--GVFPEHKYEIVKRLq-----

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-----xxxxxx-----

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aqrtlhglqapdtx-----
-----
-----mftdrthvselnqmaeeakrraeiar|xxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----
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[illegible]

-----eevfe-----

-----elk-----ct-kqgl'tane-----

-----ashr|dvfgpnk|e-ekke-----

$$-sk||kf|gf-m-----$$

-----wnp|swvmevaa--|mai a

lang-----g-----g-----rpp-----dwqdfvgiv

c--l-l-----l instisfiee-----nn-----ag----na

aaa|ma--g|-----

-----apk-tkv-----

-----lrd-----nq--wse-----q

e_____

-----asiLVPGDVISIkI-----

-----GDI | PADARLLdg-----

-----d--p|k|DQSSLTGESIPVTKn-----

—X—

-----X-----DEVFS-GSIC-----

kq---geie-----a|VIATGVHTFFGkaah|vdn-----

-----tnqighfqvltsignfcicsialgiivel

- l v m p i q r r ----- r y r d g i d n l V L L I G G

IP|AMPSV|SVTMTGSH-RLfqqg-----

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-----eh
vflaar-----asr-----

-----ienqdaid--aaivgm-----
-----lad--pkeara-----

-----gvrevhffpfnpvdk-rtal-----

-----t-----yvds-d-gnwhrask-----
-----gap
e-----qilnlc-----

-----nckedvrrkv-hgvidkf--aer-----glrsLAVARQev-----
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KMITGDQLAIGKETGRRLLGM-----

-----gtnmypssalIgqvks-----

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lxxx-----x-----
eq---mmaalylqvsiiisqali-fvtrsrswsyacp-----gllllgafviaqlva
tfiavyanwsfariiegagwgv-----
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aqrtlhglqpaekxx-----

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xxxxx-xxxx-----

v
>athlll_IIIA06 NP_178762.1
m-----

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-----xxxxxxx-----xdl-----

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lang-----g-----g-----rpp-----dwqdfvgit

c--l--l-----iinstisfiee-----nn-----ag-----na

aaalma--nl-----

-----apk--tkv-----

-----lrd-----gr--wge-----q

e-----

-----aaiLVPGDLISikl-----

-----GDIVPADARLLeg-----

-----d--p|kIDQSALTGESLPATKhx-

-----x-----

-----DEVFS--GSTC-----

kq---geie-----aVVIATGVHTFFGkaahlvds-----

-----tnnvghfqkvltaignfcicsigimliei

-iimypiqhr-----kyrdgidnILVLLIGG

PIAMPTV|SVTMAIGSH-RLsqg-----

-----a|TK-RMTAIEEMAGMDVLCSDKTG-----

-----TLTLNKLTvdknli-----evfskdvd-----

-----dy

villsar---asr-----

-----venqdaid--tsivnm-----

-----lgd--pkeara-----

-----gitevhflpfnpvek-rtai-----

-t---yidt-n-gewhrck-----

-----gap

e-----qiie|c-----

--dlkgetkr-ra-hei idkf--aer---glrsLGVARQrv-----
-----pekdkesagtpwefVGLLPLFDPPRHDSAETIRRALD Ig-VNV
KMITGDQLAIGKETGRR LGM-----

-----gtnmy psssl l-enkdd-----

-----ttggvpvde-----

lieka--dGFA--GVFPEHKYEIVRKLq-----
--er--kh-----IVGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARSASDIVLTe-PGLSVIVsaVLTSRAIFQRMKNYT-----I
yav-sitir-ivlgfmlvaliwef-----dfspfmvlii
ai lndgti-----mtiskdrv kpspi pds wkl kei
f-atgvvlgty malvtvvffwlahdttffs-----xxxxvrs
lxxx-----x-----
ee---liavlylqvsiisqali-fvtrsrswsfverp-----glllliaffvaqlia
tliatyahwefarikgcgwgw-----
-----cgviwi---ys--ivtyipldilk-----
-----fitrytl-----

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aqrtlhg lkppes-----

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xxxxx-xxxx-----

v

>athlll_lla07 NP_191592.1

m-----

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-----xxxxxxx-----

-----xdl-----

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-----hlk-----

-----ct-keg ltsne-----

-----vqer l t lfgynkle-ekke-----

-skil kflgf-m-----

-----wnplswvmeaaa--lmaig
lahg-----g-----g-----kpa-----dyhdfvgiv
v--l-l-----l instisfvee-----nn-----ag-----na
aaalma--ql-----

-----apk-aka-----
----vrd-----gk--wne-----i
d-----
----aaeLVPGDIVSIkl-----
----GDIIPADARLLeg-----

-----d--plkIDQATLTGESLPVTkn--

--x-----
-----x-----ASVYS--GSTC-----
kq--geie-----aVVIATGVHTFFGkaahlvds-----

-----tthvghfqkvltaignfcicsiavgmaiei
-vviyglqkr-----gyrvgidnILVLLIGG
IPIAMPTVISVTMAIGAH-RLaqqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLSDknli-----evfkrgidr-----

-----dm
avlmaar-----aar-----

i
>athlll_lla08 NP_189850.1
m-----

-----xxefs-----

-----xxxxxxx-----xdl-----
-er ipveevfe-----

-----q|k-----cs-keglssde-----

-----gakrleifgankle-ekse-----
-nkflkflgf-m-----
-----wnplswvmesaa--imaiv
lang-----g-----g-----kap-----dwqdfigim
v--l-l-----iinstisfief-----nn-----ag-----na
aaalma--nl-----

-----apk-tkv-----
-----lrd-----gk-wge-----q
e-----
-----asiLVPGDLSIKl-----
-----GDIVPADARLLeg-----

-----d-plkIDQSALTGESLPTTKhx-----

-----x-----

-----DEVFS--GSTC-----
kq-----geie-----aVVIATGVHTFFGkaahlvds-----

-----tnnvghfqkvltsignfcicsiglgmliei
-limypiqhr-----tyrdgidnlLVLLIGG
IPIAMPTV|SVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLSVdksli-----evfpknmds-----

-----ds
vvlmaar-----asr-----

-----ienqdaid--asivgm-----
-----lgd--pkeara-----

-----gitevhflpfnpvdk-rtai-----

-t-----yide-s-gdwhrssk-----
-----gap
e-----qiieic-----

--nlqgetkrka-hevidgf--aer----glrsLGVAQQtv-----
-----pektkesdgspwefVGLLPLFDPPRHDSAETIRRALElg-VNV
KMITGDQLAIGIETGRRLLGM-----

-----gtnmypstslgnskde-----

-----slvgipide-----

lieka--dGFA--GVFPEHKYEIVKKLq-----
--er--kh-----ICGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARSASDIVLTe-PGLSVIIsaVLTSRAIFQRMKNYT-----I
yav-sitir-ivlgfmlvaliwr-----dfapfmvlii
aiIndgti-----mtiskdrvkpsvpdswkInei
f-atgvvlgtymalttvIffwlahdtdffs-----xxxvrs
ixxx-----x-----
ee----lmaalylqvsii sqali-fvtrsrswsfverp-----gfllliafviaqlva
tliavyanwgfarivgcgwgw-----
-----aggiwv--ys--iityipldilk-----
-----fiiryal-----

-----tgkawdnminqktafttkkdykgereaqwal
aqrtlhglppea-----

-----mfndnkn--elseiaeqakrraevarlxxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----

v
>athIII_IIIA09 NP_178181.1
m-----

-----xx-----xxdss-----
-----xxxxxxx-----xdl-----
-ekipieevlt-----
-----qlr-----ct-regltsde-----
-----gqtrleifgpnkle-ekke-----
-nkvlkflgf-m-----wnplswvmelaa--imaia
lang-----g-----g-----rpp-----dwqdfvgit
v--l-l-----iinstisfiee-----nn-----ag-----na
aaalma-gl-----
-----apk-tkv-----
-----lrd-----gk-wse-----q
e-----
--aaLVPGDIISIkI-----
--GDIVPADGRLLdg-----

-----d--pIkIDQSALTGESLPVTKhx-----

-----x-----

-----QEVYS--GSTC-----

kq---gele-----aVVIATGVHTFFGkaahlvds-----

-----tnqeghfqkvltaignfcicsiaigmliei

-vmypiqkr-----ayrdgidnILVLLIGG

IPIAMPTV|SVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----

-----TLTLNKLTvdksmv-----evfvkdldk-----

-----dq

llvnaar---asr-----

-----venqdaid--acivgm-----

-----lgd--preare-----

-----gitevhffpfnpvdk-rtai-----

-t---yida-n-gnwhrvsk-----

-----gap

e-----qiieic-----

--nlredaskra-hdi idkf--adr---glrsLAVGRQtv-----
-----sekdknspgepwqfLGLLPLFDPpRHDSAETIRRALDlg-VNV
KMITGDQLAIGKETGRRlGM-----

-----gtnmypsaIlgqdkde-----

-----siaslpvde-----

lieka--dGFA--GVFPEHKYEIVKRLq-----
--em--kh-----ICGMTGDGVNDAPALKRADIGIAV--
-----xxxxxx-----

-----ARSASDIVLTe-PGLSVIVsaVLTSRAIFQRMKNYT-----I
yav-sitir-ivmgfmlIaliwkf-----dfspfmIiv
aiIndgti-----mtiskdrvkpSpIpdswkIkei
f-atgvvlgtYlavmtvvffwaaestdffs-----xxxvrs
ixxx-----x-----
he---ltaavylqvsivsqali-fvtrsrswsyverp-----gfwIisaffmaqlia
tIiavyanwnfarirgigwgw-----
-----agviwl---ys--ivfyipldilk-----
-----fiirysl-----

-----sgrawdNvienktaftskkdykgereaqwaq
aqrtlhglpaqtXX-----

-----mfndkstyrelseiadqakrraevarlxxxxxxxxxxxxxxxxxxxx

xxxxx-xxxx-----

|

>athlll_IIIA10 NP_173169.2

m-----

-----xxxx-xxlld-----

-----xxxxxxx-----

-----xdl-----

-gilpleevfe-----

-----ylr-----ts-pqgllsgd-----

-----aeerlki fgpnrl e-ekqe-----

-nrfvkflgf-m-----

-----wnp|swvmeaaa--lmaia
|ans-----q--s-----lgp-----dwedftgiv
c--l-l-----linatisffee-----nn-----ag--na
aaalma--r|-----

-----alk-trv-----
-----lrd-----gq-wqe-----q
d-----
-----asiLVPGDIIISIkI-----
-----GDIIIPADARLLeg-----

--X-----
 -----X-----EQVFS--GSTC-----
 kq---geie-----aVVIATGSTTFFGktar l vds-----

-----aITK-RMTAIEEMAGMDVLCGDKTG-----
-----TLTLNSLTVdknli-----evfvdymdk-----

-----dt
i l l a g r ----- a s r -----

-----lenqdaid--aaivsm-----

-----lad--preara-----

-----nireihflpfnpvdk-rtai-----

-t-----yids-d-gkwyratk-----

-----gap

e-----qvlnlc-----

--qqkneiagr-v-yaiidrf--aek---glrsLAVAYQei-----

-----peksnnspggpwr fCGLLPLFDPPRHDSGETILRALSlg-VCV

KMITGDQLAIAKETGRRLLGM-----

-----gtmypssslghnnd-----

-----ehaipvde-----

liema--dGFA--GVFPEHKYEIVKILq-----

--em--kh-----VVGMTGDGVNDAPALKKADIGIAV--

-----xxxxxx-----

-----ARSSADIVLTd-PGLSVIIlsaVLTsRAIFQRMRYT-----V

-----x-----xxeev-----

-----xxxxxxx-----xdl-----
-envpieevfe-----

-----slr-----cs-reglttea-----

-----aderlal fghnkle-ekke-----
-skflkflgf-m-----
-----wnplswvmeaaa--imaia
lang-----g-----g-----kpp-----dwqdfvgii
t--l-l-----vinstisfieee-----nn-----ag-----na
aaalma--rl-----

-----apk-akv-----
-----lrd-----gr--wge-----q
d-----
-----aaiLVPGDIIISIkI-----
-----GDIVPADARLLeg-----

-----d--plkIDQSSLTGESLPVTKgx-----

-----x-----

-----DGVYS--GSTC-----
kq--gele-----aVVIATGVHTFFGkaahlvdt-----

-----tnhvghfqqvltaignfcicsiavgmiiei
-vvmypiqhr-----ayrpgidnILVLLIGG
IPIAMPTV|SVTMAIGSH-RLsqg-----

-----aITK-RMTAIEEMAGMDVLCSDKTG-----
-----TLTLNKLTVdknli-----evftkgvda-----

-----dt
vvImaaq-----asr-----

-----lenqda id--aaivgm-----
-----lad--pkeara-----

-----gvrevhflpfnpdk-rtal-----

-t-----yids-d-gkmhrvsk-----
-----gap
e-----qilnla-----

--hnraeierrv-havidkf--aer----glrsLAVAYQev-----
-----pegtkesaggpwqfMGLMPLFDPPRHDSAETIRRALNig-VNV
KMITGDQLAIGKETGRRLLGM-----

-----gtnmypssal lgqhkde-----

-----sigalpidd-----

lieka--dGFA--GVFPEHKYEIVKRLq-----
--ar--kh-----ICGMTGDGVNDAPALKKADIGI AV--
-----xxxxxx-----

-----ARSASDIVLTe-PGLSVII saVLT SRAIFQRMKNYT-----I
yav-sitir-ivlgfml laliw kf-----dfppfmvli i
ai lndgti-----mti skdrvkpslpdswk lse i
f-atgvvfgsymammtviffwaaykt dffp-----xxxxvst
lxxx-----x-----
hdxxxxlasaiylqvsii sqali-fvtrsrswsyverp-----gml lvvafilaqlva
tliavyanwsfaaiegi gwgw-----
-----agviwl-----yn--ivfyipldi ik-----
-----fliryal-----

-----sgrawdlvieqrvafrqkdfgkeqrelqwah
aqrtlhglqapdax-----

-----mfperthfne lsqmaeeakrraeiar lxxxxxxxxxxxxxxxxxxxx
xxxxx-xxxx-----

v
>ddi IV_IV01 XP_643540.1
m-----

-----xxxxxxxsnnsstn-----

--cytlflnd--

-----xxxxxxx-----

-----gkkfpknfirttkyt-----il-----

-sfipknlfeqf-

-----r-r|snfyfl---cvlii

-qlv----pqisp-----llp---l-ts---ilp

lsfv-l-----iiatkealed-----yn-----ry---qs

dkknnlepyt-----ivr-----

-----d-akl-----x-----t-----i

s-

---sqdlCVGDIIRIqn---

---GQQIPADLVLIst---

shdeg-l---cyVETSNLDGETNLKVRka-
lgdtnklstaedisllrgsivyetpnerlyrfngrivixx
x-----eniihs
lnh-----
t-----MFLQR---GSQL-----r
nt---kfif-----gVCVYAGVDTKLFlnqqppps-----
kfstveklInkliilfvfifqlivcllca
-vasafyqeivvedm-----lylg-----xxxslsiygvrnfftyFILFNTM
IPISLWVTIEMVKVGQAK-FMefdsym-----
xxxxxxxxxxxxeekevekg
-cKAK-TSNLNEDLGRIQHIFSDKTG-----
-TLTENIMRfc-----kcsigsdly-----
xxxxxxxxxxx
xxxxx---xxxx
xxxxx-----i---lxngt---x
----xxxx-----xxxx---sf
lrilslc---htvi
---sex---dxx-----xxx---xx
yqsqspde---lalvht---as-n
ngfv---f---ldrrtd-----ei
-----llr-x-----n
gvdt---syglilaielfssarr-rmsv---i---vr
x-p-----e-----g---t
-----ik---l-----l
-t-----k-----
-----gad
m-----siscrllxxk-----x

xxx--xx--det-lnf|knf--srd---gyrtLMVAERdl--tveeyedwkqffq---
as-----tsienreekieavcel-iekdlslVGTTAIEDKLQNPETISYLLNag-LHI
WVLTGDKQETAVNIGYSCRL-----fdpamel i-----

-----fv-----ntes--xx-----ecgxxxx-----

-----xxxxxxxxxxxxxxxxxxxxgqxxxqxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----xxeyglvidghtlft-----
-----a|-----
-----ndhkekflr-----

lgracksvlCC--RTTPLQKALVVRVvk-----
--qs--ek-----k-----ISLAIGDGANDVSMIQEAHVGI--
-----fgkegtq-----

-----AARASDYCIHqfSHLKRLl--CVHGRYSYIRVSGLI-----Q
ysf-yknms-ftlcllwfsfssl f-----tgqtifdswiitfy
nilfts|ppffylfekdidee-----simenpnlyksiqqsqilskks
f-fvwnllglwhslvtf-fgvk-llf-----xxxxxxxxxv-----

ag--iwtlgtlvstasiltvnvr-maieklwnyisl v-----gmiislaayfimlv
yafflp|n-xxxxxxx-----sql-----
-----etgsyy-----ft--iiviiivaifpd-----
-----fcikyys-----rmya-----p-----kdt
-----xxxxxx-----

-----xxxxxxxxremkefnxxx-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).

This image shows a full page of handwriting practice paper. It features ten identical rows of horizontal guidelines. Each row is composed of three lines: a solid top line, a dashed middle line, and a solid bottom line, providing a structured space for practicing letter formation and alignment.

xxxxxxxxxxxxhnlldgg

--- irtiyand ---

-----xxnkkypsnr i sntkyt-----i i-----

-----tfipknlmeqf-----

g ramniyfl migil
qlf psitp vdp v st wga
lffi f aisavkeafdd yn rs rr
dkkaner iyn ilr

xn xkqq

q
sqn ILVGDIVYLte
NEE IPCDLLVLst

sd kit n xlyVQTSNLDGETDLKIKys

iket sgl el sq lksfgv lecpvpnae inkf dsr lsmxx
xxxxxxx
hs dwlp
vds
s NLVLQ ATHL k
nt nyiy gLVVYTGNETKL Gkn km dvpt

kwtkldk qinrtt ivifciqltlvlifg
figdyiri iqghtq wyld xxxxs lsskti iiplrfLLLNSMM
IPI SLKV TiDVIKYAYAL Fl nwd lkm

yn sd idcp
aTAN STALSEDLGQIEYIFTDKTG
TLTENVM LFs kcsingivy
xxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxddd ddddxkxyelxxxxxxxxxxxxx
ef
frslslc htiv
pmxxxdxxxxxxxxxx

ykssspde—ealvnaxxxxgaxf—
 tsktxxs—lttein—gnx—
 x—
 nyql lhtfeftsdrk-rmsv—xixxit—
 ssxxi—i—
 t—k—
 gad—
 e—iifkl|qxxsxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
 xxxxxx—
 xxxxxxxxnly—skqidef—ash—glrtLCLAQRii—qkedyerwyqshyq—x
 at—taiqdrsllineayel—lerdlhlLGITAIEDKLQEDVPRTIECLRQaq—IKI
 WMLTGDKYSTAIQIANSCNL—ietnqnin—
 xxxnnnnnnxxxxxxxxnnnnnnnn—
 xxxxxxxxxxxynxxxxsxxxxxxxxxxxxxxxxxxxx
 xxassiiieghvlsi—
 v|—
 mfsaseflk—
 sq|vgs|ICC—RVTPSQKAQVVKMIk—
 dt—gk—ITLAIGDGGNDVSMIQEANVGVG|—
 sgreglq—
 ASRAADYSLArfKYLQELI—LVHGRYSYLRTSFAA—N

-----XXXXXXXXXXXXX
xxxpktvyinn-----

-----XXXXXXXXXX-----

-----nnknknknknk-----

-----cimvl
xwld-----vsxxxgps
tinlxix-----linaikegyed-----fr-----ry-----qs
dkrtnsqick-----

-----vle-----
-----xxxxx-----xx-----xxx-----i
sxx-----
-----wkdLKEGDIVFlen-----
-----GNCFPADLILss-----

-----sgessxg--xcfIETSNLDGESNLKYKqs--

-----xxxxxxxxxxxxxxxxnnnnnnnnicnfkfneksieceganlnlnkfdgsiqllx
xxxxxxx-----
-----nieklp
lti-----
-----e-----QLLIR--GTRLxxx-----
-----nyiy-----gL VYVGHETKYMIntmstpt-----

-----krsklektmeriliylfivqllclfst
-lmglyfdlnfhkgs-----wyld-----xxnfpmttftrfftfLVLFSTM
IPISLYVTiEVIRFLQVL-Slnkdkkm-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxtkefeetf-----
-----aEAR-TSNLNEELGQVEYIFSDKTG-----
-----TLTKNEMVfk-----icsingkiy-----
-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxxxxxx-----eklidls-----ixenl-----
-----ef
vivlaic-----ntvl-----
-----ptxxxexx-----xxxxxxxx-----

-----ysssspde-----talvea-----ay-n-----
-----lgik-----l-----ysktpn-----si-----
-----tiyxxx-----t
gefk-----tfkiInieftsdrrmsi-----i-----lh-----

-----xxd-----l-----n-----q-----
-----ji-----l-----y-----
-s-----k-----
-----gad
s-----silplldxxnxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx-----
xxx--xx--kns-keslklf--ssn-----glrtLCITKRll--sddeylewnklyke--
as-----lsmierdikmeliskq-ietkltilGVTAIEDKLQDNVSTTISTLIKag-IKI
YILTGDKVETAITIGLSCSL-----lkdllli-----

-----xxxxxxxxxllxxxxyxxxxxxxx-----
-----xxefgliidgntltvxx-----
-----ml-----
-----kecedkfyk-----

m-----

-----XXX
X-----XX
XXi ssgaar-----xx
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
-----xxxxxxx-----
--srnifinq-----
-----xxxxx-----
-----pfkfi hnkisttkyt-----pw
-sfipknlyeqf-----
-----r-raanfyfl-----viavi
-qli-----pgisp-----vna--y-tt--wip
lifv-l-----avtavkegied-----ik-----rn--ls
dktvnnldcr-----ilr-----
-----n-gkf-----x-----i-----
-----v
p-----
--wkqVKVGDI CQVnk-----
--GERFPADLVVLns-----

seqhgxcylETSNL DGETNLKQRqa
xpqtfeilrseedlahfrgniecehpnrvivyngaiqmxx
dsqkhp
lnn
tQTLLRGCVLr
ntewiygAVVYTGEDTKLMqnstdaps
krstleklvnralinlfiiimfvvcvvgm
ivsviltstnidkqwyldxxxkdvrkavlnlfsfMIAFAVM
IPISLYVSIELVKVAQAVYVgwdvkm
ydpetntp
aRTRTSNLSEELGQIEYIFSDKTG
TLTRNQMDFIkcsvgkmvy
xxxxxxxxxxxxxxxx
xxxxx-xxxx
xxxxxfgfkdrrixthlxxxxx
xxxx-xxxx-ef
ltllavchsvv
pdx-nxxxxx-xx
yeasspdeaalvsaak-n
lgya-f-ynrdptgc
lvn-x-r
gkie-rfevlvlefnssdrk-rmsv-i-cr
x-p-q-g-r
i-i-l-y
-c-k
gad
t-tvlpplr-k-x

xxx--xx--sit-leflqdf--aad---glrtLCLAYTyl--eedyqqwnelyke---
aa-----isiqdrdmkvdkysel-iernlsllGSTAIEDKLQEGVPQAIAANLIKan-IKI
WVLTGDKQETA INIGFSCHL-----ltsdmr i i-----

-----i-----lngs--xx-----edvxxxx-----
-----qgxxxxxxxxxxxxxxx-----
-----xxgfalvvegscInf-----
-----aI-----
x-----gelksvfle-----

laancksvlCC--RTTPLQKAQVVKMvr-----
--dt--lr-----a-----VTLAIGDGANDVSMIQAAHIGIGI--
-----sghegmq-----

-----AVMASDYSIAqfSFLYRLL--VVHGRWDYKRNSKLM-----L
ycf-yknmv-famtqfwfgiynsf-----saqtmfdswsisif
nvvtglpiivcaifdqdsae-----ssqkypqlyasgqkdsefnlrv
l-wwwiveawihsvvif-fgvy-gly-----xxxxxxxxxxxxt-----

ld--lwamgnifilvvitvnfk-lafetrywtwithf-----siwasiliwfawvav
laaipgigxxxxxxxxx-----yvaykif-----
-----aspsfw-----ls--iavlpticlapd-----
-----viykyiq-----rdvk-----p-----yny
-----xxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxmgvespqqxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

XXXXXXXXXXXX

```
>ddi IV_IV05 XP_643182.1
```

m

xxxxxxxxxxxxxxxxrttypni

---yfntfknn-----

XXXXXXXXXXXX

-----kslfsdneisttkyt-----ry-----

-----nf i fkn l feqf-----

-----k-kytniyfv---ivsvi
-tli-----pevsp-----ldp--s-tt---ilp
lgli-v-----gltaikeayed-----fk-----ry---ra
dkssnykeyl-----iyq-----

-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxexskf-----x-----|-----
-----i
k-----
----sknIKVGDIIKIdn-----
----NQSIPADII LLss-----

-----sslgdv---cfVETSELDGESNLKIFks-

-----xxxxxxxxxxxnlnesqqeqqqfiklkgniqcefpnnlykfgiInlxx
xxxxxxxxxxxxxxxxxxxxx-----
-----eittis
lse-----
-----k-----QLLLR--GSTL-----r
nt---efiy-----gIVVYCGRDTKLSlnqkspps-----

-----kystvekmisksvigififkmilviist
-ivgtlvterttks-----wylw-----xxxxxsiglvivktffayFAYLSFL
VPMSLLITIEIVKVSQGG-FMqfdlImxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxenkivhky-----
-----mTVK-NSNLNDELALVKYIFSDKTG-----
-----TLTENKMIFk-----kcsiggkiy-----

-----qspnesq--lxneixx-----xxxxxxx
xxxxxxxxxx-----xxxx---ef
linmttc---hsav-----
-----sex-dxx-----xx---xx-----

-----yqspspde--isllnc---sk-l---
-----nqfi--f--kernng-----ei-----
-----kiq-x-----l
kkek-----tfklitsmdftserr-rmsv---v---lk-----

-----xxxxx-----k-----
-----iy--l-----y---
-s-----k-----
-----gad
s-----vmmsr|kxxnxxxxxxxxxxxxxxxxxxxxx-----

xxx--xx--ekt-tqhikef--sne---glrtLILAMKei--eidqfnqwfekyns---
il-----nsienreeqieelnnq-lendltlIGCTAIEDKLQDGPETIEFLLNsn-IKV
WIITGDKQETAINGYSCKL-----lshsnqlf-----

-----ii-----nsns-----rdnxxxx-----

-----xxxxxxxxxiexxnxxxxxxxxxxxxxxxxxxxxx---
-----xxnyslvidgeslif-----
-----if-----
-----lefenkf|s-----

iakkchsv|CC--RVTP|QKSL|VKMVk-----
--kd--t-----xe-----VCLSIGDGANDVSMIQEANIGIGI--
-----fgnegsq-----

-----ASRASDYSLLrFRHLSRLI--TIHGRYSMIRNAACI-----R

-----xxxxxeipmng-----xx-----
-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxx-----
---prtvhign-----

-----xxxxx-----

-----khgygkneiatsrys-----si-----
-sripriivsql-----
-----i-rlinvyfi---iiivl
-sfi-----dgvsp-----tgk---f-tt---lgp
wlit-i-----tisvltreied-----lk-----rq---kq
deavnygtse-----vfr-----

-----n-gqf-----x---q-----
-----t
|-----
---wkdIRVGDIVKVRn-----
---RQYFPADIYIFst-----

-----sepen-v---cwFESKNLDGETNLKQRqa-

-----xketiylkdnaellsnfcgliecnspkdlhlkgsfff-

-----ddnyvi
ltp-----
-----k-----QLLLR---GTKL-----r
nt---ewin-----gVVMYTGIDTKLMqntekvke-----

-----kkshiedltnhfiiiffllqillcggsa
-iangvwstsnhdv-----wyll-----xxxtgiveggksfltfLVLYNNI
IPISFYATiEVVRFIQTC-FInndvem-----

-----yheetdtp-----
-----aLVK-TANLNEELGQIEYVFTDKTG-----
-----TLTQNAMTFk-----kcs iggyvy-----
-----xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxvdlnddk--lxedlxx--x-----
-----xxxx-----xxxx-----ef
fyvlsic-----hsvi-----
-----p-----lxx-----xxx-----xx-----

-----yiatspde--nalvfa-----ak-s-----
-----fgfe--f--ihkttk-----av-----
-----ylk--x-----n
gvedx-----kfel lnvl dfsserk-rmsv-----i--vk-----

-----x-p-----t-----g-----r-----
-----im--l-----y-----
-c-----k-----
-----gad
s-----vifdklax-----

xxx--xx--dts-i thi qdf--gyq----glrtLCVASTql--dervyqqwaqqyhaxxx
ltxxxxpsql ekdkeiervael-i etdfql LGVTGVEDKLQEGVPETIQLLTEag-IKM
WMLTGDGQENAINIGYSSGL-----mnenyemi-----

-----ii-----nert-----kenxxxx-----

-----xxxxxxxxx|qxxnxxxxxxxxxxxxxxxxxxxx
xxxxxxxxx-----xxklvlvidggtlkf-----
-----v|-----
x-----davgftflr-----

l a k m c d t v I C C -- R V S A H Q K S K I V K L V r -----
-- k t -- f a ----- p ----- K T L A I G D G A N D V M M I Q C A H V G I G I --
----- n g k e g n q -----

----- A I Y A A D Y S I S q f Q H L G R L L -- M V H G H S Y R R M S K L I ----- C
y i f - y k n i v - l y f c q f l f a i f s g w ----- s g q t l f e t y n l t a y
s v v y t l i p l i v y c v l e k d v n e r ----- t i y q h p q l y k e g i q h k y f n h f t
f - l q w i a n g f y h g f v a f - a l v y x t v v ----- x x x x x x x x t -----

q e -- l y a f g i i v y s c v m l i v t l k - l a l e t h h w t w i n h l ----- a m w g s l v v f f i w n v i
y a t i n t t a x x x x x x ----- y a i f h i g -----
----- e s a h y y ----- l l -- l v f v p t l a l w r d -----
----- f t w k y v y ----- r t f l ----- p ----- d q s
----- x x x x x x x x x x x x x -----

----- x x x x x x x x x i k s y r p n n x x x x x x x x x x x x x x x x
x x x x x x x x x x x -----

>ddi IV_IV07 XP_645972.1

m -----

[illegible]

-----tekng-s---sfIRTDQLDGETDWKLRRs-

-----vnitqklsl dedlvnl rasiyaekpkkdinyfnftnxx

-----sgetes
lsv-----
-----e-----NTLWS-NTVl-----
as---gnvi-----gCAVYTGRETRCVmntstpst-----

-----kvglldneIntlskilfvlllclslmi
-tlkgfrgl-----wyiy-----lfryLLLFSAl
lPlSMRVNlDLGKTVYSW-MMmkdpl i-----
-----pg-----
-----tVVR-SSTlPEELGRVEYLLTDKTG-----
-----TLTQNDMVfk-----klhlgsvsf-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xxxxxxxxxxxxx-----xxxxxxxfsrk-ik-----
-----ea
itaialc---hnvt-----
-----pvxx-----
-----xxxxxxxxxxxxxxxxxxxxx
xxx
xxxx-----yqasspde-valvkf---te-s-----
-----vnlv--l--tgreln-----si-----
-----tl-----
lnpl-xxxx--kyei lnifpftsetk-rmgi---i---vr-----

-----x-k-----d-----g-----e-----
-----it--f-----y-----
-m-----k-----
-----gad
a-----imaklv--xax-----

[illegible]

>ddi IV_IV08 XP_643516.1

m

xxxxxxxrkkarp

---syp i i eir-----

XXXXXXXXXXXX

-----skgyksndisttkyt-----ry-----

-----nf i fkn l feqf-----

-----k-ritniyfa---aicvi
-tli-----pqvsp-----lsp---v-ts---llp
lifv-l-----vvtalkeafed-----yr-----ry---ka
dkasnytqyq-----vyr-----

-----d-gsf-----x-----l-----
-----i
k-----
----skhICVGDFIRIdn-----
----DQAFPSDILVLss-----

-----nledg-i---cyVETSQLDGETNLKLFka-

-----aketnsltqeqlldlnaniecelpnnnlykfkgtlxx

-----dnstfs
lse-----
-----k-----QLMLRxxGARL-----r
nt---hfii-----gIVLYCGKDTKLSlnqknpps-----

-----kfstietrlgrsvigifcfkvvlviiat
-vlsllfefntards-----wylr-----xxxxslgftivknfvsvyFAILSFL
IPMSLMVTIEVVKVSQAK-YMewdvkm-----xxxx
xxskilnky-----
-----mSVK-NSNLNDELALIKYIFSDKTG-----
-----TLTENRMLFs-----kcsingtcf-----

-----dgamnqq--lxdevxx--x-----
-----xxxx-----xxxx-----ef
llnmslc-----haav-----
-----sdx-nxx-----xxx--xx-----

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXkYkkkskXXXXXXXXXX
-----XXXXXXXXXXXXXXXXXXXX
XX
XX
xxxdrgteinrXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XX
XX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXhnnnnneqitssvatXXXXXXXXXXtsxxxx
xtfipkvifyqf-----
-----sr|anlytxxxilcmf
xfsp-----vgxxxlt
llvv-i-----avtsfkelaed-----lk-----rh----kq
dkeingrets-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXnpxmv-----
XXXXXXX-----xx---xxx-----c
h-----
---wedIKVGDIIVVkn-----
---GESLPADIICLss-----

-----srsdg-r---ayLETANLDGETNLKAKss-----

-----iskcqwikgaklddfsc kvdyegpnndiysfdgvlitix
XXXXXXXXXXXXXXXX-----
-----ttnyvp
vsi-----
-----d-----QLLLR-GTKL-----r
nt---dwvi-----gVVTYSGVDTKIEknaskasq-----

-----krssvergvnnkliliflqticiics
-ighnrwhleddkda---xxwyid-----xdpeqtedfiyvsvVILYNTL
IPLSMYVSmEMIRVSNAH-FIdsdlem-----

-----ydestdtp-----
-----aQAR-NTNINEELGQIQYLFSDKTG-----
-----TLTCNEMVFh-----rctiggqvy-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxInplgip--vxpeixxxx-----
-----xxx-----xxx-----ef
ltclaic-----ntvl-----
-----ie--kxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xx-----

-----yqaaspde--esltlt-----aa-r-----
-----ygfi--l--ksredn-----ii-----
-----tis--x-----h
gree-----rfellnvlefnysyrk-rmsv-----i--vk-----

-----n-----q-----xn-----q-----
-----ik--i-----y-----
-c-----k-----
-----gad
s-----viferakxxt-----

xxx--xxxqst-ekhlsef--acs-----glrtLCMSVRti--eheeyiawnkihqe--
as-----islvkkaekvdaacel-iekdl||IGSTGIEDRLQDHPETISALREag-IKV
WVLTGDKQETAISISTSSAV-----ineemeli-----

-----il-----nesn--xx-----almxxx-----
-----x
xx-----
-----xxhiaiiidgstlal-----
-----al-----
x-----pdlyfflq-----

vaktcesvVCC--RCSPSQKAKVVNLVa-----
---erxxlf-----xxxa-----|TMS|GDGANDVPM|QKAHVGVGI--
-----sgregmq-----

-----AVLASDFA|AnfSMLRRLI--LVHGNRSYKRMTKLI-----L
ysf-sknia-lsisqfwfgffsgf-----sgqmiydfldftly
nalfts|pvi|gtfdqdtked-----dl|lnkpylrvqcnspsfstwk
f-iwwvfigmwqsatif-fvtfxvmn-----xxxxxxxxxt-----

lg--lwsigtaayiy|lvvtvnlq-isfitrywtrqtil-----avsisvvstflfvml
ysvlgryvxxxxx-----hiifely-----
-----alptfw---ll---liiapsiallp-----
-----yiivsln-----

-----xxxxxxxx|slqk|n|xxxxxxxxxxx-----

-
>athIV_IV01 NP_568146.1

m-----

-----xxxxxx

xxxkeikded-----

---arliyind---

-----xxxxxx-----

-----rfeftgnsiktakys-----vf----

-tflprnlfeqf-----h-rvayiyfl----viavl

-nql-----pqlav-----fgr--g-as---imp

lafv-l-----lvsaikdayed-----fr-----rh---rs

drvennr lal-----vfe-----

-----d-hqf-----x-----e-----k

k-----

---wkhIRVGEVIKVqs---

---NQTLPQCDMVLLat---

-----sdptg-v---vyVQTTNLDGESNLKTRya-

-----kqetllkaadmesfngfikcekpnrniygfqanmei--

-----dgrrls
lgp-----
-----s-----NIILR--GCEL-----k
nt---awal-----gVVVYAGGETKAMInnsgaps-----

-----krsrletrmnleillslflivlctiaa
-ataavwlrthrddl--xxxxfyrrxxxxxxxxxxxxxxxxxgwgeweifftffmaVIVYQIM
IPISLYISmELVRIGQAY-FMtnddqm-----
-----ydessdss-----
-----fQCR-ALNINEDLGQIKYLFSDKTG-----
-----TLTDNKMEFq-----caciegvdy-----

-----xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxlktgkaxxexkrax-----
-----ef
flslaac---ntiv-----
-----pixxtxxxxxxxxx-----

-----yqgespde--qalvya---aa-a---
-----ygfl--l--iertsg-----hi-----
-----vinx-----r
getq-----rfnvlglhefdsdrk-rmsv---i-----

-----xgxxxxs-----
-----vk--l-----f-----
-v-----k-----
-----gad
s-----smfgvmdxxy-----

>athIV_IV02 NP_568633.1

m—

---krfvyind---

```
-----xxxxkelccdnr i snrkyt-----lw
```

-nf |pkn |weqf-

-----s-rfmnqyfl----liacI
-qlw-----slitp-----vnp--a-st---wgp
lifi-f-----avsaskeawdd-----yh-----ry---ls
dkkanekevw-----ivk-----

-----xgxkkh-----
-----i
q-----
----aqdIQVGNIVWLre-----
----NDEVPCDLVLLgt-----

-----sdpqg-v---cyVETAALDGETDLKTRvi-

-----psacvgidlellhkmkgviecpvpdkdirrfdanmrIxx
xxx-----
-----dndvcs
lti-----
-----k-----NTLLQ--SCYL-----r
nt---ewac-----gVSVYTGNTKLGmsrgiaep-----

-----kl tamdamidkltgai fvfqi vvvlvlg
-iagnvwkdtearkq-----wyvq-----xxxxapwyellvipIrfELLCSIM
IPISIKVSIDLVKGLYAK-Flewdvem-----
-----idqetgta-----
-----sYAA-NTAISEDLGQVEYILTDKTG-----
-----TLTDNKMIFr-----rcciggify-----

-----xxxxxdkdaq--lxnaixxxxxxxx-----
-----rf
ltvmaic---ntvl-----
-----pvxxxaxx-----xx-----


```
ysf-yksll-icfiqiffsfisgv-----sgtslfnsvslmay
nvfytsvpvlvs-vidkdlsa-----svmqhpqilfycqagrlinpst
f-agwfgsrslfhaiivfxitihxyay-----
```

>athIV_IV03 NP_176191.1

-----xxxxxxxxxxxxhqrtpsrx-----
-----xxx-----

---yrtvycnd-----

-----xxxxx-----

-----pvr fkgns isttkyn-----vf-----
-tflpkg l feqf-----
-----r-r ianiyfl---gisc l
-smt-----p-i sp-----vsp---i-tn---vap
l smv-l-----lvs likeafed-----wk-----rf---qn
dmsinnstve-----ilq-----

-----d-qqw-----x-----s-----
-----i-----
p-----
---wrkLQVGDIVKlkk-----
---DGFFPADILFMss-----

-----tnsdg-i---cyVETANLDGETNLKlRka-

-----lertwdylvpekayefkgeiqceqpnnsl ytf tgnlvv-

-----qkqt l p
l sp-----
-----d-----QLLLR--GCSL-----r
nt---eyiv-----gAVVFTGHETKVMmnamnaps-----

-----krstlekkldkliitifcvlvtmcliga
-igcsivtdredk-----ylg-----xxxxxxxxnglmigfftfttIVTLFSSl
lPISLYVS iEMIKFIQSTxFlnrdlnm-----

-----yhaetntp-----
-----aSAR-TSNLNEELGQVEYIFSDKTG-----
-----TLTRNLMEff-----kcsiggvsv-----
-----xxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxxxxxx-----fnfddpr-----lxrgaxx-----x-----
-----xxxx-----xxxx-----el
frclaic-----htvl-----
-----pex-----dxx-----xxx-----xx-----

-----yqaaspde-----aalvta-----ak-n-----
-----fgff-----f-----yrtrpt-----mv-----
-----yvr-----x-----s
hvekxxxxxxxxayeilnvlefnstrk-rqsv-----v-----cr-----

-----x-p-----d-----g-----r-----
-----lv-----l-----y-----
-c-----k-----
-----gad
n-----viferlaxx-----

xxx--xx--kvt-rehlehf--gss-----glrtLCLAYKdl--npetydswnekfiq--
ak-----salrdrekkldevael-iekdlilIGSTAIEDKLQEGVPTCIETLSRag-IKI
WVLTGDKMETAINIAYACNL-----innemkqf-----

-----vi-----sset--xx-----irexxxx-----
-----xxxxxx
xxxx-----xxxxxxxxxxslxxxqx-----xxxxxx-----
-----xxklslvidgkclmy-----
-----al-----
x-----pslrvmls-----

m

[illegible]

-----syedg-i---cyVETMNL DGETNLKVKrs-

-----levtlslddydsfkdf tgiircedpnpslytfvgnley--

-----erqifp
ldp-----
-----s-----QILLR-DSKL-----r
nt---pyvy-----gVVVFTGHDTKVMqnstksps-----

-----krsriektmdy i iytllvllilisciss
-sgfawetkfhmpkw-----wylr---xxxxxxxxxxnpvyagfvhl itaLLL YGYL
IPISLYVS iEVVKVLQAS-Flnkd lhm-----
-----ydsesgvp-----
-----aHAR-TSNLNEELGQVDTILSDKTG-----
-----TLTCNQMDFI-----kcsiagtsy-----
-----xxxxxxxxxxxxxxxxxxx-
x-xxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxx-----fgfedir--lxdgnxx--x-----
-----xxxx-----xxxx-----lf
frilaic-----htai-----
-----pex-nxx-----xxx--xx-----

-----yeaes pde--asflta-----as-e-----
-----fgfv--f--fkrtqs-----sv-----
-----yvh--x-----r
lshs-xxxxxeykvlnlldftskrk-rmsv---v--vr-----

-----x-e-----e-----g--q-----
-----i l--l-----l-----
-c-----k-----
-----gad
s-----i i ferla-k-----x-----

xxx--xx--gpt-tkhlney--gea---glrtLALSYRkl--deeeysawnaefhk---
ak---xsigdsrdellerisdmi-iekdlilVGATAVEDKLQKGVQCIDKLAQag-LKL
WVLTGDKMETA INIGYCSL-----lrgmkqi-----

-----ci-----tvvn--xx-----
-----xxxxxx
x-xx-----xxxxxxxxxxavxxxkx-----xxxx-----
-----xxafaliiidgkltly-----
-----al-----
x-----demkyqfla-----

lavdcasv ICC--RVSPKQKALVFPLFp-----
--yaxxtg-----k-----ITLAIGDGANDVGM IQEADIGVGI--
-----sgvegmaq-----

-----AVMASDFSIAqfRFLERLL--VVHGHWCYKR I AQMI-----C
yff-yknia-fgltlfyfeaftgf-----sgqsvyndyylf
nvvltslpvialgvfeqdvse-----iclqfpalyqqgkknlf fdwyr
i-lgwmngvysslvif-flnixiiy-----xxxxxxxxxt-----

ad--mdavgttmftci iwavnvq-ialtvshftwqh v-----liwgsiglwylfval
ygmmpspxxxxxx-----ilveila-----
-----papiyw-----ia--tflvtvtvlp y-----
-----fahisfq-----rflh-----p-----ldh
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
-----xxxxxxxxarvdak i xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxx-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).

>athIV_IV05 NP_177414.1

m

```
-----argrirs-----xx-----
-----xxxxxxxxxxxxxxxxxxxxx-----
-----
```

-----XXXXXXXXXXXXXXXXXXXX-----

XXXXXXXXXX

```
-----XXXXXXXXXX-----
--srtvfcng-----
```

---srtvfcng-----

XXXXXX

```
-----xplryrsnyvsttryn-----|i-----
-tffpkslyeqf-----
```

-tffpkslyeqf-----

-----h-raanlyfl---vaai l
-svf-----p-lsp-----fnk--w-sm---iap
lvfv-v-----glsmikealed-----wr-----rf---mq
dvkinarktc-----vhk-----

-----sxgvf-----x-----q-----
-----r
k-----
---wkkVSVGDI VKVek-----
---DEFFPADLLLLss-----

-----syedg-i---cyVETMNL DGETNLKVKrs-

-----levslp ldddesfknfmatircedpnpnlytfvgnl ef--

-----erqtfp
ldp-----
-----s-----QILLR--DSKL-----r
nt---tyvy-----gVVVFTGFDTKVMqnstksps-----

-----krsriertmdy i iytllvllilisciss
-sgfawetefhmpkm-----wylr---xxxxxxxxxxxnpiyagvvhl itaLLL YGYL
IPISLYVS i EVVKVWQAS-FInqdlhm-----
-----yddesgvp-----
-----aNAR-TSNLNEELGQVHT I LSDKTG-----
-----TLTCNQMDFI-----kcsiagtsy-----
-----xxxxxxxxxxxxxxxxxxx-xxx
x-xxxxxxx---xxxxxxxxxxxxxxxxxxxxxxxxxxx---x-----

-----xxxxx---xxxx
xxxx-----fgfednr---lxngnxx---x-----
-----xxxx-----xxxx---qf
frilaic---htai-----
-----pex-nxx-----xxx---xx-----


```
yff-yknia-fgltlfyfeaftgf-----sgqsvyndyylf
nvvltslpvialgvfeqdvsse-----icqlfpalyqqgtnlffdsr
i-lgwmcngvyaslvif-flnixiyy-----xxxxxxxxxt-----
```

>athIV_IV06 NP_175830.1

-----arrirs-----xx-----
-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXX-----
---trivhcng-----

-----XXXXXX-----

-----xxlirysnyvsttryn-----||-----
-tflpkclyeqf-----
-----h-rvanfyfl---vaail
-svf-----p-lsp-----fnk---w-sm---iap
lvfv-v-----glsmgkealed-----wr-----rf---mq
dvevnsrkas-----vhk-----

-----gxgdf-----x-----r-----
-----r-----
t-----
---wkrIRVGDIVRVek-----
---DEFFPADLLLLss-----

-----syedg-i---cyVETMNL DGETNLKVKrc-----

-----ldatla lekdesfqnfsgtikcedpnpnlytfvgnl ec-----

-----dgqvyp-----
ldp-----
-----n-----QILLR---DSKL-----r-----
nt---ayvy-----gVVVFTGHDTKVMqnstksp-----

-----krsriekrmdy i iytlfallltvsfiss
-lgfavmtkl lmaew-----wylr---xxxxxxxxxxnplyawvvhl itaLLL YGYL
IPISLYVS i EVVKVLQAH-FInqdlql-----

-----ydsesgtp-----
-----aQAR-TSNLNEELGQVDTILSDKTG-----
-----TLTCNQMDFI-----kcsiagtsy-----
-----XXXXXXXXXXXXXXXXXXXX-xxx
x-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-

-----xxxxx-xxxx
xxxx-----fsfednr--lxnenxx-x-----
-----xxxx-----xxxx-----mf
frilavc-----htai-----
-----pex-dxx-----xxx--xx-----

-----yeaespede--vaflva-----sr-e-----
-----fgfe-f--tkrtqs-----sv-----
-----fia-x-----r
fsss-xxxxxeykiInlIdftskrk-rmsa---i--vr-----

-----x-e-----e-----g--q-----
-----i|---|-----|-----
-c-----k-----
-----gad
s-----iiferls-k-----x-----

xxx--xx--gat-skhlavy--gea---glrtLALGYRkl--deteyaawnsefhk---
ak---xsvgadrdeklekvsdm-mekeli|VGATAVEDKLQKGVPCIDNLAQag-LKI
WVLTGDKMETA INIGYACSL-----lrgmkqi-----

-----si-----sltn--xx-----
-----xxxxxx
xxxx-----xxxxxxxxxxasxxxkx-----xxxx-----
-----xxafaliiidgkltly-----
-----al-----
x-----ddvkyqfla-----

grrrirs xx
xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx
trivhcnq
xxxxxx
xvlytsnyvsttryn li
tflpkclyeqf
h-rvanfyfl vaai
svf p-lsp fnk w-sm iap
lifv-v glsmgkealed wr rf mq
dvkvnsrkat vhr
gxgdf x r
r
k
wkkLRVGDVVKVek
DQFFPADLLLLss

-----syedg-i---cyVETMNL DGETNLKVKrc-----

-----ldvtlplerddtfqsfsgtikcedpnpnlytfvgnley-----

-----dgqvyp
ldp-----
-----s-----QILLR-DSKL-----r
nt---syvy-----gVVVFTGHDTKVMqnstksps-----

-----krsriekrmdyiiytlfallvlvsfiss
-lgfavmtkmhmgdw-----wylr-----xxxxxxxxxxnpfhawvvhltavLLYGYL
IPISLYVSiELVKVLQAT-Flnqdlqm-----
-----ydsesgtp-----
-----aQAR-TSNLNEELGQVDTILSDKTG-----
-----TLTCNQMDFI-----kcsiagtsy-----
-----xxxxxxxxxxxxxxxxxxx
xx-----

-----xxxxx---xxxx
xxxx-----fsfedqr---lxggnxx---x-----
-----xxxx-----xxxx---mf
lrilavc---htai-----
-----pex-dxx-----xxx---xx-----

-----yeaespede-vafiva---ag-e-----
-----fgfe-f-tkrqtq-----sv-----
-----fis-x-----r
--hs-xxxxxeykfInvl dftskrk-rmsv---i---vr-----

-----x-e-----k-----g-----q-----
-----i|---|-----|-----
-c-----k-----
-----gad
s-----iiferls-k-----x-----

XXX

>athIV_IV08 NP_189425.1

m

-----x-----gerrk-----xx-----
-----xxxxxxxxxxxxxxxxxxxxxx-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----X-----XXXXXX-----

```

-----srvvfcnd-----
-----

```

XXXXXX-XXXX

-----yr gnyvsttkyt-----aa-----

nfipkslfeqf-----

-----r-rvaniyfl---vvafv
-sfs-----p-lap-----yta--p-sv---lap
lliv-i-----gatmvkegved-----lr-----rr---kq
dveannrkve-----vlg-----

-----xt-gtf-----x-----e-----
-----t
k-----
----wknLRVGDLVKVhk-----
----DEYFPADLLLLss-----

-----syedg-i---cyVETMNL DGETNLKLKha-

-----leitsdeesiknfrgmikcedpnehlysfvgtlyf--

-----egkqyp
lsp-----
-----q-----QILLR--DSKL-----k
nt---dyvy-----gVVVFTGHDTKVMqnatdpps-----

-----krskiekkmdqiiyilfsiliviaftgs
-vffgiatrdrmsdn-xxxxxwylr---xxxxxxxxxxxravaaaffhfItaLMLYGYL
IPISLYVSiEVVKVLQSI-FInqdqem-----
-----yheetdrp-----
-----aRAR-TSNLNEELGQVDTILSDKTG-----
-----TLTCNSMEFv-----kcsiagtay-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxx-----

-----xxxxx--xxxx
xxxx-----fnfwder--ixdgqxx--x-----
-----xxxx-----xxxx--kf
frvlaic---htai-----
-----pdx-nxx-----xxx--xx-----


```
yff-yknla-fgftlfwyeyasf-----sgkpayndwmyscy
nvfftslpvialgvfdqdsar-----lclkypllyqegvqnvlfswer
i-lgwmIngviissmii-f-ltixtma-----xxxxxxxxxv-----
```

>athIV_IV09 NP_177038.1

-----xxxgtrrrr-----xx-----
-----xxxxxxxxxxxxxxxxxxxx-----

-----x-----xxxxxx-----
---srvvycne-----

-----xxxxxx-xxxx-----

-----ysdnyvrttkyt-----la-----
-tflpkslfeqf-----
-----r-rvanfyfl---vtgvl
-aft-----p-lap-----yta---s-sa---ivp
llfv-i-----gatmvkegved-----wr-----rq---kq
dnevnnrkvk-----vhr-----

-----xd-gsf-----x-----a-----
-----k
e-----
---wktLSIGDIVKVek-----
---NEFFPADLVLLss-----

-----syeda-i---cyVETMNL DGETNLKVKqg-

-----levtsslrdefnfkgfeafvkcedpnanlysfvgtmel--

-----kgakyp
lsp-----
-----q-----QLLLR--DSKL-----r
nt---dfif-----gAVIFTGHDTKVIqnstdpps-----

-----krsmiekkmdki iylmffm vitmafigs
-vifgvtttrddldkg---xxxwylr---xxxxxxxxxxrapvaaiyhfltaVMLYSYF
IPISLYVSiEIVKVLQSI-FInqdihm-----

-----yyeadkp-----
-----aRAR-TSNLNEELGQVDTILSDKTG-----
-----TLTNSMEFi-----kcsvagtay-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxx-----fnfrder-----ixngnxx-----x-----
-----xxxx-----xxxx-----kf
frllavc-----htvi-----
-----pex-----dxx-----xxx-----xx-----

-----yeaespde-----aafvia-----ar-e-----
-----lgfe-----f-----fnrtqt-----ti-----
-----svr-----x-----l
dlvs-xxxxxlykvlnvlefnstrk-rmsv-----i-----vq-----

-----x-e-----d-----g-----k-----
-----||-----|-----|-----
-c-----k-----
-----gad
n-----vmferls-----k-----x-----

xxx--xx--eet-rdhvney--ada----glrtLILAYRel--dekeykvfnerise--
ak---xsvsadreslieevtek-iekdlilLGATAVEDKLQNGVPDCIDKLAQag-IKI
WVLTGDKMETAINGFACSL-----lrqdmkqi-----

-----ii-----nlet--xx-----iqsxxxx-----
-----xxxxxx
xxxx-----xxxxxxxxxxgkxxxkx-----xxxx-----
-----afaliiidgkslay-----
-----al-----
x-----ddikhifle-----

lavscasv ICC--RSSPKQKALVTRLV k-----
--sg--ng-----k-----TTLAIGDGANDVGMLQEADIGVGI--
-----sgvegmaq-----

-----AVMSSDIAIAqfRYLERLL--LVHGHWCYRRISTMI-----C
yff-yknit-fgftlflyetyttf-----sstpayndwflsly
nvffsslpvialgvfdqdsar-----yclkfpillyqegvqnvlfswr
i-lgwmfngfysaviiif-fckxslq-----xxxxxxxxxt-----

pg--reilggtmytcivwvnlq-malaisyftliqhi-----viwssivvwyffitv
ygelpsr ixxxxxx-----vfveala-----
-----pslsyw----li--tlfvvatlmpy-----
-----fiysalq-----msff-----p-----myh
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxvgftar lxxxxxxxxxxxxx-----

>osaIV_IV01 NP_001042736.1

m-----

-----xxxxxxx
xxfrrepdp-----xx-----
-----xxxxxxxxxxxxx
-----xxx-----
--sravvvge-----
-----xxxxxx-----
-----aagfagngvrtakys-----vl-----
-tf|prnlfeqf-----r-r|syvyfl-----aitvl
-nql-----pqvav-----fgr-g-as-vlp
lafv-l-----fvtavkdayed-----lr-----rh-rs
drqennr lar-----vll-----
-----xxxxa-gef-----x-p-----k
k-----
--wkhIRVGDVVRVas-----
--SETLPADMVLLat-----

sdpsg-v---ahVQTVNLDGETNLKTRYa-
kqetqlrfsqdggiiggvlhcerprnrniygfqanlei-
dgkrvs
l gp
s---NIVLR---GCEL---k
nt---twai---gVVVYAGKETKVMInssgaps---
krsrletqlnretvilsimligmottas
-vlagiwiInhrgdI---xxxxffrexxxxx---xxxxxxxgmgmqifitfImaVIVYQVI
IPISLYISmELVRLGQAY-FMgadrdI---
ydessrsk
fQCR-ALNINEDLGQIKYVFSDKTG
TLTENKMEFq---casirgvdy
c
sgxxxcxx
svgespde-qaIvya---aa-s
ygiv---I---vertsg---yv
vidx---I
gdrq---rfdilglhefdsdrk-rmsv---i
xgxxxxt
vk---I---y
-v---k
gad
s---slfgitkxxlx---

----xxxxrat-eahlhky--ssf----glrtLVIGMRel--sqpefeewqlayen---
-----xstsvlgrgnlrsvaaxienniriLGATGIEDKLQDGVPETIESLRQad-IKV
WILTGDKQETAISIGYSCKL-----lndmtqi-----

-----vi-----nnns--xx-----sckxxxx-----

-----xxxxxxxxiaxxxtxxxxxxxxxx-----
-----xxtlali vdgns lvy-----
-----i l-----
x-----telqeelfk-----

varecsvvLCC--RVAPLQKAGIVALIk-----
---nr---t-----xd-----MTLAIGDGANDVSMIQMADVGVGI---
-----sgqegrq-----

-----AVMASDFAMGqfRFLVPLL--LVHGHWN YQRMSYMI-----L
ynf-yknat-fv l v lfwy vlytaf-----tltta itewss lly
tvlytslptivvgil dkdlske-----tllaypklygsgqrdekynvnl
f-vlnmlealwqslvvf-ympyxayr-----xxt-----

id--msslgd lwalapvivvnml-lamdifrnwivha-----fvwgtiaatticlfv
idsiwlfpxxxxxxxxxxx-----dflyeyg-----
-----grpsfi-----

>osaIV_IV07 NP_001067827.1

m

-----XXXXXXXXXXXX

XX

XXvagssyqXXXXXXXXXXXX

-----XXXXXXXXXXXXXXXXXXXX

XXXXXXX-----

-----XX

xxrrrrlrlrg-----

-----XXXXXXXXXXXX

-----xxxxxxxxpndycdnr isntkyt-----||-----

-nflpknlweqf-----

-----r-rfmnqyfl-----liacI
 -qlw-----slitp-----vnp--a-st---wgp
 lifi-f-----avsatkeawdd-----yn-----ry---is
 dkqanekevw-----ivk-----

 -----xxxxxxx
 xxxxxxxxxxxrxgpt-----
 -----i
 q-----
 ---aqdIRVGNIWVlre-----
 ---NEEVPCDLVLlgt-----

 -----sdsqg-i---chVETAALDGEIDLKTRvi-

 -----pltcvgldseqlhkikgvi ecnpdkdirrldanirlxx
 xxx-----
 -----dndicp
 lti-----
 -----s-----NTLLQ--SCYL-----r
 nt---ewac-----gVAVYTGNETKLGmsrgvpep-----

 -----kltsmdamidkltgai flfqiavvvvlg
 -sagnvwkdtearkq-----wyvk-----xxxepwyqilviprlrFELLCSIM
 IPISIKVSI DFVKSLYAK-Fldwdeem-----
 -----ydh etdtp
 -----aHAA-NTAISEDLGQVEYILTDKTG-----
 -----TLTENKMIFr-----rcciggtfy-----

 -----xxxxxda lrdve---lxnavxxxxxxxx-
 -----kf
 ltvmtlc-----ntvi-----
 -----p ixxxsxx-----xx-----


```
ysf-yksll-icfiqilfsflsgi-----agtslfnsvslmay
nvfytsipvltt-vldkdlsek-----tvmqnpeillycqagrlinpst
f-agwfgrrslyhaivvfxitvhxyan-----
```

>athIV_IV10 NP_189189.1

-----x-gpsrrrr-----xx-----
-----xxxxxxxxxxxxxxxxxxxx-----

-----x-xxxxxx-----
---srvvycne-----

-----xxxxxx-xxxx-----

-----yagnyvrstkyt-----va-----
-sffpkslfeqf-----
-----r-rvanfyfl---vtgil
-slt-----d-lsp-----yga--v-sa---llp
lalv-i-----satmvkegied-----wr-----rk---qq
dievnnrkvk-----vhd-----

-----xn-gif-----x-----q-----
-----e
e-----
---wrnLRVGDIVRVek-----
---DEFFPADLLLLss-----

-----syeds-v---cyVETMNL DGETNLKVKqg-

-----xeatssl nqdsdfkdfrgvvr cedpnvnl yvfvgtlal--

-----eerfp
lsi-----
-----q-----QILLR--DSKL-----r
nt---eyvy-----gAVVFTGHDTKVIqnstdpps-----

-----krsriertmdkiiylmfglvflmsfvgs
-iifgvetredkvkn-xxxxxwylk---xxxxxxxxxxrapmaaiyhfftaTMLYSYF
IPISLYVSiEIVKVLQSI-Flnrdihm-----

-----yyeetdkp-----
-----aQAR-TSNLNEELGMVDTILSDKTG-----
-----TLTCNSMEFi-----kcs i agkay-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxx-----

-----xxxxx--xxxx
xxxx-----fnfeder--vxngnxx--x-----
-----xxxx-----xxxx--kf
frllavc-----htai-----
-----pex--dxx-----xxx--xx-----

-----yeaespde--aafvva--ar-e-----
-----fgfe--f--fnrtqn-----gi-----
-----sfr--x-----l
dlvs-xxxxxxvyrllnvlefnstrk-rmsv---i--vr-----

-----x-d-----d-----g--k-----
-----||--|-----|-----
-s-----k-----
-----gad
n-----vmferla--k-----x-----

xxx--xx--akt-qehvnqy--ada---glrtLVLAYRev--deneyiefnksfne---
ak---xsvsedrealideitdk-merdliiLGATAVEDKLQNGVPECIDKLAQag-IKI
WVLTGDKMETAINIGFASSL-----lrgemkqi-----

-----ii-----nlet--xx-----iksxxxx-----
-----xxxxxx
xxxx-----xxxxxxxxxxgkxxxax--xxxx-----
-----xafaliiidgkslty-----
-----al-----
x-----deikkmfld-----

latscasv ICC--RSSPKQKALVTRLV k-----
--sg--tg-----k-----TTLAIGDGANDVGMLQEADIGVGI--
-----sgvegmaq-----

-----AVMSSDIAIAqfRYLERLL--LVHGHWCYSRIASMI-----C
yff-yknit-fgvtvflyeaytsf-----sgqpayndwflslf
nvffsslpvialgvfdqdsar-----fcykfpillyqegvqnifswkr
i-igwmfngfisalaif-flckxslk-----xxxxxxxxxt-----

ag--reilggtmytcvvvvvnlq-malsisyftwvqhi-----viwgsiafwyiflmi
ygamtpsfxxxxxx-----vfleala-----
-----papsyw----lt--tlfv mifalipy-----
-----fvyksvq-----mrff-----p-----kyh
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxvgytarrxxxxxxxxxxxxxxxxxxxx
xxxxx-----

>mmuIV_IV01 NP_033857.1

m-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----tsladqe-----

--xvrtifinq-----

-----xx-----

-----ltkfcnnhvstakyn-----vi-----

-tflprflysqf-----

-----r-raansffl-----fiall

-qqi-----pdvsp-----tgr---y-tt---lvp

llfi-l-----avaaieiiied-----ik-----rh---ka

dnavnkkqtq-----vlr-----

-----n-gaw-----x-----i-----

-----v-----

h-----

-----wekVNVGDIVllkg-----

-----KEYIPADTVLLss-----

-----sepqa-m---cy|ETSNLDGETNLK|Rqg-

-----lpatsdikdidslmr|sgr|iecespnrhlydfvgnir|lx-

-----ghgtvp
lga-----
-----d-----QILLR-GAQL-----r
nt---qvvh-----g|VVYTGHDTKLMqnstsppl-----

-----k|snver|itnvqil|ilfcil|iams|lvc
-vgsaiwnrrhsgkd-----wylh-----xxxggasnfg|nfl|tf|l|LFNNL
|PISLLVT|EVVKFTQAY-F|nwd|dm-----
-----hyeptdta-----
-----aMAR-TSNLNEELGQVKY|FSDKTG-----
-----TLTCNVMQFk-----kctiagvay-----
-----x-----

-----xx
xxxxxx-----ktfndps--|xdn|xx--x-----
-----xxxx-----xxxx-----ef
ltmmavc---htav-----
-----pexxxdx-----xx-----

-----yqaaspde-galvra---ak-q---
-----lnfv--f--tgrtpd-----sv-----
-----iid--x-----l
gqee-----ryel|nv|leftsark-rmsv---v--vr-----

-----x-p-----s-----g--k-----
-----|r--l-----y-----
-c-----k-----
-----gad
t-----viyer|a-----x-----

xxx--xx--eit-lkhleqf--ate---glrtLCFAVAei--sesdfeewravyhr---
as-----tsvqnrllkleesyel-ieknlqilGATAIEDKLQDQVPETIETLMKad-IKI
WILTGDKQETAINIGHSCRL-----lkrnmgmi-----

-----vi-----negs-----ldgxxx-----

-----xxxxxxxxxalxx-----
-----xxdfaliiidgktlky-----
-----al-----
x-----fgvrqyfld-----

lalsckavICC--RVSPLOKSEVVMV-----
--kq--v-----xv-----ITLAIGDGANDVSMIQTAVGVGI--
-----sgneglq-----

-----AANSSDYSIAqfKYLKNLL--MVHGAWNYNRVSKCI-----L
ycf-ykniv-lyiieiwfafvngf-----sgqilferwcigly
nvmftamppltlgi ferscrke-----nmlkypelyktsqnaIdfntkv
f-wvhcIngIfhsvilf-wfplxalq-----xxxxxxxxxt-----

sd--ylllgnfvytfvvitvclK-agletsywtwfshi-----aiwgsialwvffgi
ysslwpavxxxxxxx-----geaamlf-----
-----ssgvfw-----vg--llsipvasllld-----
-----vlykvik-----rtaf-----k-----tlv
-----xxxxxxxx-----

-----xxxxxxxxkslteraqxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

-----r-rvanfyfl---vtgvl
-slt-----a-lsp-----ysp---i-sa---llp
ltfv-i-----aasmvkeaied-----wg-----rk---kq
diemnnrkvk-----vhd-----

-----xn-gif-----x-----r-----
-----e
g-----
----wrLKVGNIVRVek-----
----DEFFPADLLLLss-----

-----syeds-i---cyVETMNL DGETNLKVKqg-

-----xeatssalhed sdfkelkavvkcedpnadlytfvgtlhf--

-----eeqr lp
lsi-----
-----t-----QLLLR--DSKL-----r
nt---eyiy-----gVVVFTGHDTKVIqnstdpps-----

-----krsrierkmdkiiylmfgvvflmsfigs
-ivfgietredrvnxxxxxwylr---xxxxxxxxxxrapmaavyhfftaVMLYSYF
IPISLYVSiEIVKVLQSL-Flnndilm-----
-----yyeendkp-----
-----aHAR-TSNLNEELGMVDTILSDKTG-----
-----TLTCNSMEFi-----kcsiagtay-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxx-----

-----xxxxx--xxxx
xxxx-----fnflder--vxkgnxx--x-----
-----xxxx-----xxxx---kf
frllavc---htai-----
-----pex-dxx-----xxx---xx-----

-----yeaespde--aafvva----ar-e-----
-----fgfe--f--fsrtqn-----gi-----
-----sfr--x-----l
dlas-xxxxxxvyrllnvlefnsark-rmsv----i--vr-----

-----x-e-----d-----g--r-----
-----||--|-----|-----
-s-----k-----
-----gad
n-----vmferla--k-----x-----

xxx--xx--ekt-rehvney--ada---glrtLILAYRev--deneyiefsknfne---
ak---xsvtadreslideiteq-merdliiLGATAVEDKLQNGVPDCIDKLAQag-IKI
WVLTGDKMETA INIGFACSL-----lrgemqi-----

-----ii-----nlet--xx-----ikaxxxx-----
-----xxxxxx
xxxx-----xxxxxxxxxxgkxxxtx--xxxxxx-----
-----xxafaliiidgkslty-----
-----al-----
x-----ddfkkkfld-----

latgcasv|CC--RSSPKQKALVTRLV-----
---sg--tg-----k-----TTLAIGDGANDVGMLQEADIGVGI--
-----sgvegmq-----

-----AVMSSDIAIAqfRYLERLL--LVHGHWCYSR|SSMI-----C


```
yff-yknit-fgvtvfl yeaytsf-----saqpayndwflslf
nvffsslpvialgvfdqdsar-----ycykfp||yqegvqn||fswkr
i-igwmfngvftalaif-flckxslk-----xxxxxxxxxt-----
```

```
-----xxxxxxxxxxvgftarrxxxxxxxxxxxxxxxxxx
xxxx-----
```

>athIV_IV12 NP_173938.1

-----xxxsgrrrkr-----xx-----
-----xxxxxxxxxxxxxxxxxxxxx-----

-----x-----xxxxxx-----
---srvvfcng-----

-----xxxxxx-xxxx-----

-----ycdnyvrttkyt-----la-----
-tflpkslfeqf-----
-----r-rvanfyfl---vvgil
-sft-----p-lap-----yta--v-sa---ivp
ltfv-i-----latmfkegved-----wr-----rk---qq
dievnnrkvr-----vhr-----

-----xn-gnf-----x-----l-----
-----r
e-----
---wktLRVGDILKvek-----
---NEFFPADLVLLss-----

-----syeda-v---cyVETMNL DGETNLKLKqg-

-----levtlslreeInfrdfeafikcedpnanlysfvgtdl--

-----kgekyp
lsp-----
-----q-----QLLLR--GSKL-----r
nt---dyiy-----gVVIFTGPDTKVVqnsdpss-----

-----krsmierkmdki iylmflmvfslaffgs
-vlfgiwtrddfng---xxxxwylk---xxxxxxxxxxrapmaaiyhfltaLMLNSYF
IPISLYVSiEIVKVLQSI-FInqdihm-----

-----yyeadkp-----
-----aHAR-TSNLNEELGQVGTILSDKTG-----
-----TLTCNSMEFi-----kcsiagtay-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxx-----

-----xxxxx-----xxxx
xxxx-----fnfrder-----ixdgnxx-----x-----
-----xxxx-----xxxx-----kf
fql lavc-----htvi-----
-----pex-----dxx-----xxx-----xx-----

-----yeaespde-----aafvia-----ar-e-----
-----lgfe-----f-----ftrtqt-----ti-----
-----svr-----x-----l
dlvt-xxxxxlysvlnvlefssskk-rmsv-----i-----vq-----

-----x-q-----d-----g-----k-----
-----||-----|-----|-----
-c-----k-----
-----gad
s-----vmferls-----e-----x-----

xxx--xx--ket-rdhvney--ada----glrtLILAYRel--deneyevfterise--
ak----xsvsadrealidevtek-ieknlvILGATAVEDKLQNGVPDCINKLAQag-IKI
WVLTGDKMETA INIGFACSL-----lrrdmkqi-----

-----ii-----nlet--xx-----iqqxxxx-----
-----xxxxxx
x-xx-----xxxxxxxxxxgkxxxkx-----xxxxx-----
-----xafaliiidgkslay-----
-----al-----
x-----edmkgifle-----

laigcasv ICC--RSSPKQKALVTRLV k-----
--tg--sg-----q-----TTLAIGDGANDVGMLQEADIGVGI--
-----sgvegmaq-----

-----AVMSSDIAIAqfRYLERLL--LVHGHWCYRRISKMI-----C
yff-yknit-fgftlflyeaytsf-----satpayndwylsly
svfftslpviclgifdqdv sap-----fcl kfpvlyqegvqnllfswrr
i-lswmfhgfc saiiif-fckxsle-----xxxxxxxxxt-----

ag--rdilggtmytcvvvvslq-mvltisyftliqhv-----vwwgsvviwylflmv
ygs l p i r m x x x x x x-----vfleala-----
-----papsyw----it--tlfvvlstmpy-----
-----fifsaiq-----mrff-----p-----msh
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxvmrshqpex-----

>mmuIV_IV02 NP_056618.1

m-----

-----xxxxxxgdqleap-----

---ariiylnq-----

-----xx-----

-----lnkfcdnr istakys-----vl-----

-tflprflyeqi-----

-----r-raanaaffl----fiall

-qqi-----pdvsp-----tgr---y-tt---lvp

lvii-l-----tiagikeiied-----fk-----rh---ka

dnavnkkkti-----vlr-----

-----n-gmw-----x-----t-----

m-----i

---wkeVAVGDIVKVIn-----

---GQYLPADMVLFss-----

-----sepqg-m-----cyVETANLDGETNLKIRqg-----
-----lshttdmqtrdvlmklsgriecegnrhlydftgnlhix-----
-----gkssva
l gp-----
-----d-----QILLR-----GTQL-----r
nt-----qwvf-----gVVVYTGHD SKLMqnstkapl-----
-----krsnvekvtnvqilvlfgiilvmalvss
-vgalfwn gshggks-----wyik-----xxxtnsdnfgynlltflILYNNL
IPI SLLVTIEVVKYTQAL-Flnwdmdm-----
-----yyiendtp
-----aMAR-TSNLNEELGQVKYLFSDKTG
-----TLTCNIMNFk-----kcsiagvty
-----xxxxxxxxxx
-----xxxxx-----xxxx
xxxxxxx-----cdfndpr-----lxknixx-----x
-----xxxx-----xxxx-----ef
ltllavc-----htvv-----
-----pexxxdx-----xx
-----yqasspde-----aalvkg-----ak-k
-----lgfv-----f-----tgrtpy-----sv
-----iie-x-----m
gqeq-----tfgilnvlefssdrk-rmsv-----i-----vr
-----x-p-----s-----g-----q
-----lr-----l-----y
-c-----k-----
-----gad
n-----viferls-----x

-----XXXXXXXXXXXXXXXXXXXX-----

m-

```
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxnr eaekxxxxxxxx-----
```

---twqvkan-

-----xxxxxxxeskyasnaiktykyn-----gf-----

-tf | pmn | feqf-

-----k-raanfyfl---illil
-qai-----pqist-----law--y-tt---lvp
lllv-l-----gitaikdlvdd-----va-----rh---km
dkeinrntce-----vik-----

-----d-grf-----x-----i-----
-----i
k-----
---wkdIQVGDVIRLkk-----
---NDFIPADILLss-----

-----sepns-l---cyVETAELDGETNLKFKma-

-----xeitdqylqiednlatfdgfieeepnnrldkftgtl fw--

-----knqsfp
lda-----
-----d-----KILLR--GCVI-----r
nt---dvch-----gLVIFAGADTKIMknsgktrf-----

-----krtkidylmnymvytifivlilvsagla
-ighayweaqvgnys-----wyl y-----xxxxxtpsyrgrlfnwgyllVLNTM
VPISLYVSvEIRLGQSH-Flnwdlqm-----
-----yyaekdtp-----
-----aKAR-TTTLNEQLGQIH YIFSDKTG-----
-----TLTQNIMTFk-----kccingtiy-----
-----xxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxx-----lafydhy--lxeqixx--x-----
-----xx-----xxxx--qf
ffllsic---htvm-----
-----v---dxx-----xxx---xx-----

-----yqaaspde--galvna---ar-n---
-----fgfa--f--lartqn-----ti-----
-----tvs--x-----l
gser-----tynvlaifdfnsdrk-rmsi----i---vr-----

-----x-p-----e-----g--s-----
-----ir--l-----y--
-c-----k-----
-----gad
t-----viyerlh-----x-----

xxx--xx--qet-qdaldif--ase---tlrtLCLCYKei--eekeftewnnkfma---
as-----vassnrdealdkvyee-iekdlilLGATAIEDKLQDGPETISKLAkad-IKI
WVLTGDKKETAENIGFACEL-----ltdttic-----

-----yg-----edin--xx-----lhtxxx-----
-----xxxx-----
-----xxxsaxxxpxxxxxxx-xx-----
-----xxnraliiitgswlne-----
-----ilxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
x-----eqrqknfvd-----

lacecsavICC--RVTPKQKAMVVDLVk-----
---ry--kk-----a-----ITLAIGDGANDVNMIKTAHIGVGI--
-----sgqegmq-----

-----AVMSSDYSAqfRYLQRLL--LVHGRWSYIRMCKFL-----R

```
yff-yknfa-ftlvhwysffngy-----saqtayedwfitly
nvlysslpvllmgllldqdvsk-----lslrfglyvvqgrdllfnykr
f-fvsl|lhgv|tsmvlf-fiplxayl-----xxxxxxxxxpp-----
```

sd--yqsfavtvasalvitvnfq-igldtsywtfvnaf-----sifgsialyfgimfd
fhsagihvxxxxxxxxxx-----gtasnal-----

```
-----rqpwiw----lt--i i ltvavcl l pv-----
```

-----vairfls-----mtiw-----p-----ses

-----XXXXXXXXXX-----

-----xxxxxxxxxsvfrgrvsxxxxxxxxxxxxxxxxxxxx

XXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXX-----

>mmuIV_IV05 NP_080370.2

m-----

-----xxxxxxxedkdtef-----

---twevkand-----

-----xxxxxxxx-----

-----xxxxxqkkyksnaihtakyn-----if-----
-sflplnllyeqf-----
-----h-rmsnlyfl---fiiil
-qgi-----peist-----lpw---f-tl---fap
lvcl-f-----viratrdlvdd-----ig-----rh---rs
dkinnrpcq-----ilr-----

-----g-ksf-----x-----w-----
-----k
k-----
---wknLCVGDVVCLsk-----
---DSIVPADLLLLas-----

-----tepss-l---cyVETADIDGETNLKFRqa-

-----xtvthheltspkkmasfggtvtceepnsrmhhfvgslew-

-----nsrkyp
ldi-----
-----g-----NLLLR--GCKI-----r
nt---dtcy-----gLVlYAGLDTKlMkncgkihl-----

-----krtkldlmmnkivalifslviasllt
-vgftfmvkqfkakh---yyms-----xxxxsdamesffifwgflLILLSVM
VPMAMFIlaEFIYLGNSI-Flnwdlnm-----

[illegible]

laskcqav ICC--RVTPKQKALVVALV k-----
--ky--qq-----v-----VTLAIGDGANDVNM IKTADIGVGL--
-----agqegmq-----

-----AVQNSDYVLAqfCYLQRLL--LVHGRWSYMRVCKFL-----R
yff-yktva-smmaqi wfs l vngf-----saqpl yegwfl a l f
n l l yst l p v l y i g l f e q d v t a e-----k s l k m p e l y m a g q k g e l f n y s i
f-mqai thgt its min f-fvtvxvss-----xxxxxxxs-----

hd--yqslgvlvaissllsvtle-vmlvvkywtllfvg-----avvlslssyvlmts l
tqslwmyrxxxxxxxxx-----fadynvl-----
-----fepcsl----ll--ivlnvalnvlpm-----
-----lalrtih-----
-----xxxxxxxxxxxxxxxxx-----

-----xxxxxxxxrh lrrgipxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxx-----
-----xxx
xxx
xxx-----

>mmu IV_IV06 XP_001005370.1

m-----

[illegible]

sephg-l---cyVETAELDGETNLKVRqa-

-----xpvtselgadisslaefdgivrceapnnkldrfsvglsw-----

-----kdskha
l sn-----
-----q-----KIILR---GCVL-----r
nt---swcf-----gMVLFAGPDTKLMqnsqtktf-----

-----krtsidrlmntlwlwifgflvcgliila
-vgssilesevgdqf-----xtppf-----xxxxxxsflfsgfltfwsyVILNTL
VPISLYVSvEVIRLGHSY-Flnwdrkm-----
-----yyaskamp-----
-----aEAR-TTTLNEELGQIEYIFSDKTG-----
-----TLTQNIMTFk-----kcsingrvy-----
-----xxxxxx-xxxxxxxxxxxxxx-----

-----xxxxxx-xxxx
xxxxxx-----lhffdqs---lxesixx---x-----
-----x-----xxxx---ef
lrlalcl---htvm-----
-----se---exx-----xxx---xx-----

-----yqvqspde---galvta---ar-n
-----fgfi---f---ksrtpe-----ti-----
-----tie-x-----l
gtpv-----tyqllafldfnirk-rmsv---i---vr-----

-----x-p-----e-----g---r-----
-----ik---l-----y-----
-s-----k-----
-----gad
t-----ilfeklh-p-----x-----

-----XX-----

```
>mmu.IV_IV07 NP_056546.2
```

m-----

-----xxxxxxqpvrhkkxxx-----

-----XXXXXXXXXXXXXXXXXXXX-----

---prtvw|gh-----

-----xxxdqryprnvinnqkyn-----ff-----

-----tf|pgv|fsqf-----

-----r-yffnfyfl----llacs
-qfv-----pemrl-----gal---y-ty---wvp
lgfv-l-----avtiireavee-----ir-----cy---vr
dkemnsqvys-----rlt-----

-----sxgtv-----k-----
-----v
k-----
---ssnIQVGDLILVek-----
---NQRVPADMIFLrt-----

-----sekng-s---cFLRTDQLDGETDWKLRIp-

-----vactqlptaadllqirsyvyaeepnidihnflgtftrxx
xx-----
-----ppises
lsi-----
-----e-----NTLWA--GTVI-----
as---gtvv-----gVVLYTGRELRSVmntsdprs-----

-----kiglfdelevncltkilfgalvvvslvmv
-alqhfagr-----wylq-----iirfLLLFSNI
IPISLRVNI DMGKIVYSW-VIrrdski-----
-----pg-----
-----tVVR-SSTIPEQLGRISYLLTDKTG-----
-----TLTQNEMVFk-----rhlgtvay-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-----xx-xxxxxxx-xxxxxxxxmssr-vh-----
-----ea
vkaialc---hnavt-----
-----pvxxx-----

x-----x-xxxxx-----xxxxxx-----xxxxxx

x-----yqasspde-valvqw-----te-s

-----vglt--l--vgrdqs-----sm

-----ql-

rtpg-xxxx-nlt ilqvfpftyesk-rmgi----i---vr

-----x-e-----s-----xg-----e

-----it-f-----y

-m-----k-----gad

v-----vmagiv-xyx

-----dwI-eeecgnm-are-----glrvLVAKKsl-teeqqdfearyvq

ak-----lsvhdrs lkvatvies-le meme | LCLTGVEDQLQADVRPTLET LRNag-IKV

WMLTGDKLETATCTAKNAHL-----vtrnqdi h

-----vf-----r lvt-----nrg

-----xxxxxxxxxxxx

-----dcalvisgdslev

-----cl

-----kyeyefme

IacqcpavVCC-RCAPTQKAQIVRLlq

er-tg-----x-----LTCAVGDDGGNDVSMIQESDCGVGV

egkegkq

ASLAADFSlTqfKHLGRLL-MVHGRNSYKRSAALS-Q

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXpraritrXXXXXXXXXX

xxx-----

---artvwlgc-----

-----xxxeekhprrnsiknqkyn-----vf-----
-tfipgvlyeqf-----
-----k-fflnlyfl-----vvscs
-qfv-----palki-----gyl--y-ty----wap
lgfv-l-----avtiareaide-----fr-----rf----qr
dkemnsqlys-----klt-----

-----vxgkv-----q-----
-----v
k-----
---ssdIQVGDLLIVek-----
---NQRIPSDMVFLrt-----

-----sekag-s---cfIRTDQLDGETDWKLKva-----

-----vsctqlpalgdlsisayvyaqkpql dihsfegtftxxxx
xx-----
-----ppihes
lsi-----
-----e-----NTLWA-STIV-----
as---gtvi-----gVVIYTGKETRSVmntsnpkn-----

-----kvglldlelnqltkalfalvlsvmv
-tlqgfagp-----wyrn-----lfrfLLLLFSYI
IPISLRVNIDMGKAAYGW-MImkdeni-----

-----pg-----
-----tVVR-TSTIPEELGRLVYLLTDKTG-----
-----TLTQNEMVfk-----r l h l g t v s y-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-xxxxxxxxxx-xxxxxxx-xxxxxxxxxvssr-ih-----
-----ea
vkaialc-----hnavt-----
-----pvxxx-----

-----xx-xxxxxxxxxxxxx-----xxxxxx-----
--x-----yqasspde-valvrw--te-s-----
-----vglt--l--isrdla-----sm-----
-----ql-----
ktps-xxxx--tyci l q m f p f t s e s k - r m g i ----i--vr-----

-----x-e-----s-----xa-e-----
-----it-f-----y-----
-m-----k-----
-----gad
v-----amstiv--xyx-----

-----dwl-eeecgnm--are--glrtLVAKRtl--teeqyqdfesrysq--
ak-----lsihdralkvaavves-lereme l LCLTGVEDQLQADV RPTLEMLRNag-IKI
WMLTGDKLETATCIAKSSHL-----vsrtqdi h-----

-----vf-----rpvt-----srg-----

-----xxxxxxxxxxxxx-----
-----dcalvisgdslev-----
-----cl-----
-----ryyehel ve-----

lacqcpavVCC--RCSPTQKAHIVTLR-----
--qh--tr-----x-----RTCAIGDGGNDVSMIQAADCGIGI--
-----egkegkq-----

-----ASLAADFSITqfRHIGRLL--MVHGRNSYKRSAALG-----Q
fvm-hrgli-istmqavfssvfyf-----asvp|yqgf|mvgy
atiytmfpvfsl-vldqdvkpe-----mai|ypelykd|tkgrs|sft
f-liwvlisiyqggilm-ygal-llf-----e-----

de--fvhvvaisftaliltellm-valtirtwhwlmvv-----aeflslgcyvaslaf
lney-f-----dvafi-----
-----ttvtfl--wk--vsaitvvsc|pl-----
-----yvlkylk-----rkls-----p-----psy

-----skl--ss-----

-
>mmuIV_IV09 NP_033858.1

m-----

-----xxxxxxxxxxxxxxxxxxxxrrrwegr-----

---trtvrsnl---

-----xxxxxxxxxxxxxxxxxxxx---

-----xxxxxxxiqhladnr lkttkyt-----||-----

-sflpknlfefqf-----

-----h-r l anvyfv-----fiall

-nfv-----pavna-----fqp--g-la---lap

vlfi-l-----avtaikdlwed-----ys-----rh---rs

dheinhlgcl-----vfs-----

-----xxe-kky-----x-----n-----

-----r-----

y-----

---wkeIRVGDFVRLcc---

---NEIIPADILLss---

-----sdpdg-l---chIETANLDGETNLKRRqv-

-----vrgfseIvsefnplfttsviecekpnndlsrfrgyimhx-

-----ngekag
lhk-----
-----e-----NLLLR-GCTI-----r
nt---eava-----gIIVIYAGHETKALInnsgpry-----

-----krsqIerqmncdvIwcvllIvcisIlsa
-vghglwvrryqekk---xxfdvp-----xxxxxxspataavysfftmlIVLQVL
IPISLYVSiEIVKVCQVY-FInqdieI-----
-----ydeetdsq-----
-----IQCR-ALNITEDLGQIKYIFSDKTG-----
-----TLTENKMVFr-----rctvsgiey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx-xxxx
xxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxdItpdpk--IxeVxxxxxxxxxxxxxxxx
xxxxxxxxxxx-----xxxx----df
fialtic---ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx-xxxxxnIxxk-x-----xxx---xxx-----
-----xxxxxx-----
---xxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxxxxx
xxxxxxxxxxx-----xyeaeSpde--aaIvya---ar-a---
-----ynca--I--vdrIhd-----qv-----
-----svexxx-----I
grI-----tfelIhtIgfdsirk-rmsv---v---ir-----

-----x-p-----I-----xd---e-----
-----in-v-----y-----
-t-----k-----
-----gad
s-----vmdlIxxs-xxxxxxx-----


```
-----XXXXXX-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
```

>mmuIV_IV10 NP_795973.2

m-----

```
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxsettp||-----xx-----
```

-----XXXX-----

-----XXXXXXXX-----

---qr vvy pnn-----

-----XXXXXXXXXXXX-----

-----rrypgnsicttkyt-----||-----

—tf|pqn|feqf—

-----h-rwanlyfl---flvil
-nwm-----psmev-----fhr---e-it---ifp
latv-l-----liimvkdgied-----fk-----ry---cf
dremnsasiq-----iye-----

-----xxe-qry-----x-----l-----
-----k
r-----
---wqdVRVGDFVQMqc-----
---NEIVPADILLfs-----

-----sdpsg-v---chLETANLDGETNLKQRrv-

-----vkgfsqpevqfqpehfhistivcekpnhlskfkgymehx-

-----dqtrtg
fgs-----
-----e-----SLLLR--GCTl-----r
nt---evaa-----gIVIYAGHETKAMInnsgpry-----

-----krskierrintdiffciglflmcliga
-vgshlwngtfkehp---xfdvp-----xxxxxxslalggfymfltmlILLQVL
IPISLYVSIELVKLGQVF-LLhndldl-----
-----ydeetdls-----
-----iQCR-ALNITEDLGQIQYIFSDKTG-----
-----TLTENKMVFr-----rctivgsey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxdvtpdkn--lskvxxxxxxxx-xxxx
xxxxxxx-xx-----xxxx--df
flaltic---nsvm-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx---xxxx-fxxxaxx-----xxx---xxx-----

-----xxxx-----
-----xxx
xxxxxxxxxx-----xyyeaespe--aalvha---ar-a-
-----ysft-l-vsrtp-----qv-----
-----tvrxxx-----g
icl-----tfdllftrlgfdsvrk-rmsv---v---vr-----
-----x-p-----l-----xd-e-----
-----ii-v-----y-----
-t-----k-----
-----gad
s-----vimdllexxxxxxxxxxx-----

xxx--xx--art-qkhldly--ard---glrtLCIAKKvv--deedfqrwasfrre--
ae----aslndreeImetaqh-lenhltilGATGIEDRLQEGVPDTI AALREag-IQL
WVLTGDKQETAVNIAYSCKL-----ldqtdtv-----

-----si-----nten-xx-----tcexxxx-----
-----x
xxxx-----xxxxx--xxqqxxxkxxxxxxxxxxx--xxxxxx
xxxxxx-----glvidgktlna-----
-----if-----
x-----gklenkfle-----

ltqycrsvLCC-RSTPLQKSMIVKLVR-----
--dk-ls-----v-----MTLSIGDGANDVSMIQAADIGIGI-----
-----sgqegmq-----

-----AVMSSDFAIArfSHLKLL-LVGHWCYSRLARMV-----

```
yyf-yknvc-yvnl|fwyqffcgf-----sgstmidywqmiff
nlfftslppiifgvldkdvsae-----tllalpelysgqnsecynlpt
f-wvsmadafyqslfcf-fipy-lty-----xxxxx-----
```

```
-----xxxxxxxxxxpasasasaxxxxxxxxxxxxxxxxxx
XXXXXXXXXXXXXXXXXX-----
```

>mmuIV_IV12 NP_056619.1

-----XXXXXXXX-XXX-

-----XXXXXXXX-
---srtiyvgh-----

-----XXXXXXXX-

-----pqrypdnrivsskyt-----fw-----
-nfipknlfeqf-----
-----r-rianfyfl---iiflv
-qli-----id-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ka
dnamnqcpvh-----fiq-----

-----h-gkl-----x-----r-----
-----k
q-----
---srkLRVGDIVMVke-----
---DETFCDLIFLss-----

-----nradg-t---chVTTASLDGESSHKTHya-

-----vqdtkgfhtheadvds|hatieceqpqpdlykfvgriinvxx
xxx-----
-----dpvvrp
lgs-----
-----e-----NLLLR--GATL-----k
nt---ekif-----gVAIYTGMEtKMAInyqsksq-----

-----krsaveksmntflivylcilvskalint
-vlkyvwqseprde---xwyne-----xxxxxxxxnlfraftdflafMVLfNYI
IPVSMYVTvEMQKFLGSY-FItwdedm-----

-----fdeemgeg-----
-----pLVN-TSDLNEELGQVEYIFTDKTG-----
-----TLTENMAFk-----eccieghvy-----

-----xxxxxxxxxlpdssgixxixsspxxxxx-----
-----xxxx-----lf
fraiclc-----htvq-----xxxxx
xxxxxxxxxxx-pd-xxsxx-----

-----yisspde-valveg-----vq-r-----
-----lgft-y-lrlkdn-----ym-----
-----eilxx-----e
ndie-----rfellevltdsvrr-rmsv-----i-vk-----

-----s-----t-----xg-----e-----
-----iy-l-----f-----
-c-----k-----
-----gad
s-----sifprvixk-----

-----xdqv-rsrvern-ave-----glrtLCVAYKrl-epeqyedacrllqs-----
ak-----valqdrekklaeayeq-iekdlvILGATAVEDRLQEKAADTIEALQKag-IKV
WVLTGDKMETASATCYACKL-----frstqll-----

-----el-----ttkk-xx-----eqsxxxx-----

-----xxxxxxxxxcxxxtxxxxxxxxxx-----
-----xxdygliidgaalsl-----
-----im-----xxxxxxx
x-x-----gnyrelfle-----

icrncsavLCC--RMAPLQKAQIVKLlk-----
--fs--ke-----xp-----ITLAIGDGANDVSMILEAHVGIGV--
-----igkegrq-----
-----AARNSDYAIPkfKHLKKML--LVHGHFYIRISELV-----Q
yff-yknvc-fifpqflyqffcgf-----sqqtlydtayltly
nisftslpillyslmeqhvqid-----vlkrdptlyrdiaknallrwr
f-iywtflgvfdalvff-fgayxife-----xxxxxxxxxm-----
fg--nwtfgtlvftvmvltvtlk-laldthywtwinhf-----viwgsllfyiafsl
wggviwpf--xxxxxx-----yvfism-----
-----ssgpaw-----lg--iillvtvgllpd-----
-----vlkkvlc-----rqlw-----p-----tat
-----xxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxaqcsspsgxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxx-----

>mmuIV_IV13 NP_083846.2

[illegible]

-----drldg-s---chVTTASLDGETNLKTHvs-

-----vpetav lqtvanldsl iaviecq qpeadlyr fmg rmi ixx
xx-----
-----eeivrp
lgp-----
-----e-----SLLLR--GARL-----k
nt---keif-----gVAVYTGME TKMA lnyksksq-----

-----krsaveksmntfliiyliliseaiist
-ilkytwqaeekwde---xwynq-----xxxxxxxxskilrfisdf lafLVLYNFI
IPISLYVTvEMQKFLGSF-Flgwdldl-----
-----yheesdqk-----
-----aQVN-TSDLNEELGQVEYVFTDKTG-----
-----TLTENEMQFr-----ecsinglky-----

-----xxxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxrtspe sexx lxkeh x-----
-----lf
fkavslc---htvq-----xxxx
xxxxxxxxxxxxxn lxxxqxx-----

-----yyasspde--ka lvea---aa-r-----
-----agii--f--vgisee-----tm-----
-----evkx-----l
grle-----rykl lhi lefdsdr r-rmsv---i---vq-----

-----xxxg---e-----
-----kl--l-----f-----
-a-----k-----
-----gae
s-----silpkci xxex-----

>mmuIV_IV14 NP_001032952.1

m—

-----XXXXX--XXX--

-----XXXXXXXXXX-----

---trtvfvgn-----

-----X-XXXXXXXXXX-----

-----aqr fcdnr i vsskyt-----lw-----

-----nf|pkn|feqf-----

-----r-rianfyfl----iiflv
-qvt-----vd-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ra
dnevnksavy-----i ie

-----n-akr-----x-----r-----

e-----k
---sekIKVGDVVEVqa
---NETFPCDLILLss

-----cttdg-t--cyVTASLDGESNCKTHya-

-----vrdtialctaesidnlratieceqpdpdyrfvggrisixx
xxx-----

-----eavars
lgp-----

e-----NLLLK--GATL-----k
nt---kkiy-----gVAVYTGME TKMAInyqgksq-----

-----kcsaveksinaflivylfilltkaavct
-tlkyvwqsspynde---xwynq-----xxxxxxxfqv lkmftdf lsfMVLFNFI
IPVSMYVTvEMQKFLGSF-FIswdkdf-----

-----fdeeineg
-----aLVN-TSDLNEELQQVDYVFDTKTG
-----TLTENSMEFi-----ecc idghky

-----xxxxxxdgl sqtdxxl-ayfxxxxx
-----xxxx-----lf
lralclc---htve-----xxxx-
-----xxxxxxxegxxx-x

-----y i s s s p d e-----i a l v k g-----a k-r-----
-----f g f t--f--l g n q n g-----y i-----
-----r v e x x-----r-----
k e i e-----e y e l l h t l n f d s v r r-r m s v-----i-----v r-----

-----xelt-kdhvern--amd----gyrtLCVAFKei--ppddferinaqlve--
ak-----malqdreeklekvfde-ietnmnlIGATAVEDKLQDQAAETIEALHAag-LKV
WVLTGDKMETAKSTCYACRL-----fqntell-----

icmkctavLCC--RMAPLQKAQIVRMvk-----
 ---nI--kg-----xp-----ITLSIGDGANDVSMILESHVGIGI--
 -----kgkegrq-----

 -----AARNSDYSVPkfFKHLKLL--LVHGHLYYVRIAHLV-----Q


```
yff-yknlc-filpqflyqffcgf-----sqqplydaayltmy
nicftslpilayslleqhiniid-----tltadprlymkitgnamlqlgp
f-lhwtflaafegtvff-fgtyxlfq-----xxxxxxxxxi-----
```

yg--nwtfgtvi vftvlvftvtlk-laldtrfwtwinhf-----viwgslafyvffsff
wggiwipf-----xxxxxxx-----fvfaqml-----
-----csvstw----la--iillifislfpe-----
-----illivvk-----nvr

```
-----xxxxxxxxxxrasds|xxxxxxxxxxxxxxxxxxx
xxxx-----
```

```
>ggaIV_IV01 XP_420729.2
```

```
-----XXXXXXXXXXXXX
X-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

xxtsladqe

-xlrtifinq-

-----xx-----

-----ltkfcnnhvstakyn-----ii-----
-tflprflysqf-
-----r-raanaaffl---fiall
-qqi---pdvsp-----tgr--y-tt---lvp
llfi-l---avaavkeiied-----ik-----rh---ka
dnavnkkqtq-----vlr-----

-----n-gaw-----x-----i-----
-----v
h-
---wekVAVGEVVKVtn
---GEHLPADLISLss

-----sepqa-m---cy|ETSNLDGETNLKIRqg-

-----lp|tsdikdieslmrlsgriecespnrrhlydfvgnir|x-
-----ghgtvp
lgs-----
-----d-----QILLR-GAQL-----r
nt---qwvh-----gIVVYTGHDTKLMqnstsppl-----

-----kmsnveritniqililfciliamslics
-igsavwnrrhsed---wyld-----xxxggasnfgl nftl f l I L F N N L
IPISLLVTIEVVKFIQAY-Flnwdidm

-----hyeptdta-----
-----aMAR-TSNLNEELGQVKYIFSDKTG-----
-----TLTCNVMQFk-----kctvagvay-----
-----xxxxxxxxxxxxxx-----

-----xxxx
xxxxxx-----kmfsdss--lxenlxx--x-----
-----xxxx-----xxxx-----ef
ltmmavc-----htav-----
-----pexxxdx-----xx-----

-----yqaaspde--galvra----ar-h-----
-----lrfv--f--tgrtpd-----sv-----
-----ie--x-----l
ghee-----ryelInvleftssrk-rmsv----i--vr-----

-----x-p-----t-----g--k-----
-----lr--l-----y-----
-c-----k-----
-----gad
t-----viydr la-----x-----

xxx--xx--eit-lkhleqf--ate----glrtLCFAVAei--sesdyqewldvyhr-----
as-----taiqnralkleesyel-ieknlqllGATAIEDKLQDKVPETIETLMKad-IKI
WILTGDKQETAINIGHSCKL-----l rknmgli-----

-----vi-----negs-----ldgxxxx-----

-----xxxxxxxxxalxx-----
-----xxdfalii dgkslky-----
-----al-----
x-----fgvrqyfld-----

m-----

```
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxad|deap-
```

```
---arti yvnq---
```

-XX-

-qskfrdnwvstakys-

--VV--

-tf|prf|yeqi

-r-kaanaffl----fiail

—qqi—pdvsp—tgr—y—tt—lvp

l l f i - l ----- t v a g i k e i i e d ----- y k ----- r h ----- k a

dsavnkkktv-----vlr-

-n-gmw-

—X—

-d-

- i

V-

-wkeVAVGDI VKVtn-

-GQHLPADMIIIs-

-----sepqa-m-----cyIETANLDGETNLKIRqg-----
 -----lsltaslqsreelmkvsgriecegpnrhlydftgtlr|x-----
 -----gqspvp-----
 vgp-----
 -----d-----QILLR-----GAQL-----r-----
 nt-----qwvl-----gIVVYTGFDTKLMqnstkapl-----
 -----krsnvekvtnmqilvlfcillvmalvss-----
 -vgallwnrthgevv-----wylg-----xxxmlsvnfgynlltflILYNNL
 IPISELLVTIEVVKFTQAL-Flnwdmdm-----
 -----yypetdtp-----
 -----aMAR-TSNLNEELGQVKYLFSDKTG-----
 -----TLTCNIMNFk-----kcsiagvty-----
 -----xxxxxxxxxxxx-----
 -----xxxxx-----xxxxx-----
 xxxxxxx-----cefd DPR-----lxqni xx-----x-----
 -----xxxx-----xxxx-----ef-----
 ltl|avc-----htvv-----
 -----pexxxnx-----xx-----
 -----yqasspde-----galvkg-----ak-k-----
 -----lgyv-f-----tgrtph-----sv-----
 -----iid-x-----l-----
 gkek-----tfeilnvlefssnrk-rmsv-----i-----vr-----
 -----x-p-----a-----g-----q-----
 -----lr-----l-----y-----
 -c-----k-----
 -----gad-----
 n-----viferls-----x-----

xxx--xx--eqt-lchleyf--ate---glrtLCIAYAdl--sensyrewlnvyne---
as-----i||kdrtdqkleecyei-iekd|||LGATAIEDRLQAGVPETIATLMKae-IKI
WILTDGDKQETALNIGYSCRL-----isqsmli---

-----lv-----neds-----ldaxxxx-----

-----xxxxxxxxxs|xx-----

-----xxdiali idghtlky-----

-----al-----

x-----fevrqsfld-----

lalsckavICC--RVSPLOKSEIDMVk-----

--kh--v-----xa-----ITLAIGDGANDVGM IQTAHVGVGI--

-----sgnegmq-----

-----ATNCSDYAI AqfSYLEKLL--LVHGAWSYNRVTKCI-----L

ycf-yknvv-lyi ielwfafvngf-----sgqilferwcigly

nviftalppftl gifersctqd-----smlrfpqlykitqnadgfntrv

f-wghcinalihsii lf-wfplxvle-----xxxxxxxxxg-----

id--ylfvgnivytyvvvtvcl k-aglettawtrfshl-----avwgsml lwlvffgv

ysaiwptfxxxxxx-----gqagmvl-----

-----rcgyfw-----fg--lflvptvclvkd-----

-----vawtaak-----htyh-----k-----sll

-----xxxxxxxxxxxx-----

-----xxxxxxxxxksvnerdhxxxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxx-----

-----t-klanfyfl---vvai l
-qmi-----pglst-----tgxxxxivp
l l i f-v-----gismgkegfdd-----wr-----ry---r l
dkeenr fay-----v l r-----

-----xxxxxxxx
xxxxxxxxxxqxdm-----
-----v
k-----
----wne lKVGDVIRLer-----
----DQPVPADMVLLha-----

-----dgpnc-t---ayVETMALDGETNLKTKqp-

-----xhsvakvcgtvggicsssihfavedpnl dlykfdgnvtvx-

-----agektp
ltn-----
-----n-----EILYR--GSIL-----r
nt---erav-----gMVIYTGEECKIRmnanknpr-----

-----xkmps lqgkvnrvvml i v l l v m l a g a c t
-iaykywshdvesha-----wyle-----danvsygpvftsflIMFNTM
IPI SLYVSmE lVKVAQML-MLnadidm-----
-----ydpesdtp-----
-----I EAR-TST lNEELGQVSY lFSDKTG-----
-----TLTNNSMRFr-----kmsvagtaw-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxx-----

xxxxxxxxxxxx-----pntrtt d-mxkyixxxxx-----
-----xxxx-----xxxx-----mf
i l a m a l c-----htcl-----
-----pe---exx-----xxx---xx-----


```
gtf-wkemi-fy|tqalyqrwngy-----tgtslyepwslsmf
nt|ftslavif|giftkdl|sas-----t|lavpelytkqrsefnir|
y-lgwtfiatceamlvy-fvmyx|fg-----xxxxxxxxxi-----
```

```
-----xxxxxxxxxxeaeamearxxxxxxxxxxxxxxxxxx
XXXXXXXXXXXXXXXXXX-----
```

>ggaIV_IV04 XP_425888.2

-----xxxxxxxxxxxqkgqpaf-----

---twevwann-----

-----xxxxxxxx-----

-----xxxxxxkkytgnaiktakyn-----vl-----
-tflplnllyeqf-----
-----h-rmanvyfv---fvill
-qtf---peist-----lpw---y-tl---lfp
lsc-l-----tiralrdlmd-----ig-----rh---qs
drninsrpce-----ilc-----

-----g-esf-----x---w-----
-----q
r-----
---wrdVCVGDIVRLhr-----
---DSLVPADMLLLcs-----

-----sepss-l---cyVETSDIDGETNLKFRqa-

-----xlvthqeltsegs laafdgrvtceepnsrmhsftgvlqw--

-----rgetyp
ldg-----
-----q-----RILLR--GCKL-----r
nt---ntcy-----gLVYAGFDSKIMrscgkikr-----

-----kktkl drmmdr lvvii flvl latslcla
-vasgfwakmfqekh---syla-----xxxxxtpakqaffsfwsfTILLSVI
IPMSMYITfEFIYLVNSF-Flnwdlem-----

-----yyavkdip-----
-----aKAR-STSLNDQLGQVEYIFSDKTG-----
-----TLTQNVMSFk-----kccvngtiy-----
-----x-----xx-----

-----x-----xxxx
xxxxxx-----ldpnnvg--lxeaaxx--x-----
-----xx-----xxxx-----ef
lrlalclc-----htvm-----
-----v-----exx-----xxx-----xx-----

-----yqaaspde--ealvla-----ar-s-----
-----lgyv--f--lsrtqd-----ti-----
-----tis--x-----l
gvykr-----tyqvlamldfnsdrk-rmsv----l--vr-----

-----x-p-----q-----g-----t-----
-----ir--l-----y-----
-t-----k-----
-----gad
t-----vilerlr-----x-----

xxx--xx--dft-eraldif--aee----tlrtLCLASkeI--seaeydewgrhrv---
an-----vlqgraceIdrlyee-meqdlelLGVTAlEDKLQEGVPETIQLLKLgn-IKV
WVLTGDKQETAMNVGYACKL-----ltdmeil-----

-----ee-----keas--xx-----fkaxxxx-----

-----xxxxxxxxxsqxxxexxx-----
-----xxkralvisgdfivrxxx
xx-xxxxxxxxxxxxxxxxxgxxxxxxxx-----xxxxxxxxxxxxxxxx-----
x-----slvekafvd-----

m-

-----xxxxxxxkkk|kee-----

---erhlqann-----

-----xxxxx-----

-----qfeyasnsiktskyn-----ff-----

-tflplnlfeqf-----

-----q-rianayfl----fllil

-qli-----pqiss-----law--f-tt---vvp

lv|v-l-----avsgvkdaidd-----fn-----rh---ks

dnhvnnrpvq-----vli-----

-----n-gtl-----x-----d-----

-----e

k-----

---wmnlQVGDI|KLen-----

---NNFVTADLLLLss-----

-----sephs-l---vyIETAELDGETNLKVKqa-

-----xtvtaelgedlqkltdfngeficeapnnklndftgtlal--

-----rgekya
ldn-----
-----e-----KMLLR-GCTI-----r
nt---ewcf-----gLVIIYAGPDTKLMqnsgrttf-----

-----krtsidrImnvIvImvmcIiIshwqly
-lgnli---kgyhf---xvylp-----xxxxxsapfsafImfwsyVlILNTV
VPISLYVSvEIIRLGNSF-Yldwdrkm-----
-----yypIndtp-----
-----aQAR-TTTLNEELGQIKYIFSDKTG-----
-----TLTQNIMCFn-----kcsingksy-----
-----xxxxx-xxxxxxxxxxxxx-

-----xxxxx-xxxx
xxxxx-----fvfydhs--lxeavxx-x-----
-----x-----xxxx---kf
frllslc---htvm-----
-----pe---exx-----xxx---xx-----

-----yqaqspde--galvta---ar-n---
-----fgfv--f--rartpe-----ti-----
-----tvv--x-----m
getk-----iyklIaIldfnvrk-rmsv---i---vr-----

-----x-p-----e-----g---d-----
-----lt--l-----y-----
-c-----k-----
-----gad
t-----ilyellh-p-----x-----

-----s-kyanlffl----ftavl
-qqi-----pnvsp-----tnr---y-tt----igp
lviv-l-----lvsaikeived-----yk-----rr---ss
dkslnysktq-----v|k-----

-----g-stf-----x-----e-----
-----t
k-----
---wvdVAVGDIVRVes-----
---EQFPADLVLLas-----

-----sepeg-l---cy|ETANLDGETNLK|Kqa-

-----ipetshlvspadlsr|sgr|rseqpnsslytyeatltmx
xx-----
-----gere|p
lap-----
-----d-----QLMLR--GATL-----r
nt---pwi h-----gVVVFTGHETKLMrnatatpi-----

-----krtavermvniqilmlvsilvalsvvss
-vgdliirqtekdkl-----tyld-----xxxxnpgkqfimdiftyWVLYSNL
VPISLFVTiEIVKYSQAF-LInsdldi-----
-----yydvtdtp-----
-----aTCR-TSSLVEELGQIEYIFSDKTG-----
-----TLTCNMMEFk-----ectiggiqy-----
-----xx-----

-----xxxxx--xxxx
xxxxxx-----vgvhdfk--kxrqnxx--x-----
-----xxxx-----xxxx--hf
ltllatc---htvi-----
-----pexx-exx-----xxx--xx-----


```
ysf-yknia-lymtqfwysfqnaf-----sgeviyeswtlsfy
nvfftvlppfamgicdqfisar-----lldrypqlyqlgqkgffkrhs
f-wswiangfyhslllyxvsqxfly-----xxxxxxxxxv-----
```

ag--hwvwsalytavlatvlgk-aalitniwtkytfi-----aipgsmi iwlafipa
ygyaapai--xxxxxxx-----gtipr|f-----

-----tspify-----lm--aivlpcicllrd-----

-----yawkyak-----rmyy-----p-----qhy

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----xxxxxxxxxxmrkqrgyxxxxxxxxxxxxxxxxxxxx

XXXXXXXXXXXXXXXXXXXX-----

-----XXX-----

```
>ani IV_IV03 EAA58143.1
```

m-----

-----XX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXsgsqgedXXXXXXXXXX
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX

-----XX
xxxprdvlgq-----

-----xxrakypnivi snakyt-----pw
-sflprtlynef-----

-----s-fffnifyfl----lvals
-qii-----pvlri-----gym--s-ty---iap
lafv-v-----sislgkealdd-----vg-----rr--rr
daeanaeefs-----vla-----

-----XXXXXXXXXX
xxxxxxxxxvxvi i-----

-----k
k-----
---srdLKVGDLKVRk-----
---NQRLPADVVILksXXXXXXXXXXXXXXXXXXXXXXX

-----xxxxxxxxxxxxxxtdissxs---xtfIRTDQLDGETDWKLRIp-

-----svlsqalsledftrlkitasgpdkrvnefvgni elxx
XXXXXXXXXXXXXXXXXXXXXXX

-----qnssap
lti-----

-----d-----NTAWA--NTVL-----
as---ntit-----xaAI IYGSQTRAAIstsptrs-----

-----kvglleyeinntlkilcaltltlsiilv
-alegfqptndke-----wyva-----imiyLILFSTI
IPMSLRVNI DMAKS VYGR-Flerdkdi-----

-----pd-----
-----tVVR-TSTIPEDLGRIEYLLSDKTG-----
-----TLTQNEMELk-----kihvgtvtsy-----
-----xxxxxxxxxxxxx-----

-----xx-----
-----xxxxxxxxxxxxxxxxxxxx-xxxxxxxxigsr-vr-----
-----di-----
vlalalc-----hnvt-----
-----ptxxx-----

-----xxxxxxx-----
-----x-----yqasspde--iaivry----te-e-----
-----vglk--v--ayrdr-----ti-----
-----vl-----
estdxxxxx-xrarildifpftsdsk-rmgi----i--ve-----

-----x-dxxxxxxxxxa-----xe--e-----
-----iw--f-----y-----
-q-----k-----
-----gad-----
t-----vmtsiv--xax-----

-----dwl--deetanm--are----glrtLVGRKrI--splqyqefaskykq-----
as-----lslgrdigmqkvvnexlehdlelLGVTGVEDRLQRDVKPSLELLRNag-VKI
WMLTGDKVETARCVAISAKL-----vargqyih-----

-----tv-----akvk-----dks-----

-----xxxxxxxxxxxxx-----
-----dccllidgeslal-----
-----ml-----
-----nqfrsafis-----

vavllpavIAC--RCSPTQKAEVADLlr-----
---lh--tk-----x-----RVCCIGDGGNDVSMIQAADVGI--
-----vgkegrq-----

-----ASLAADFSITqfHHITKLL--VWHGRNSYKRSAKLA-----Q
fim-hrgli-isacqtmysiashf-----dpkglf inwlmvgy
atvytnapvfsI-vldrdvdeq-----lanlypelykelktgrsIsyrs
f-ftwvlvsyqgaviqxIsqi-Ild-----t-----

is--gkrlisvsftalvmnellm-vaiavttwhpvmif-----cllgtalvyaasvpf
lgey-f-----dlkyv-----
-----itldwi---wr--vvavtavsvipv-----
-----waaklik-----qswn-----p-----psy

-----rkvrg-----

>ggaIV_IV06 XP_417508.2

m-----

[illegible]

-----sekng-s---cflRTDQLDGETDWKLRlp-

-----vtctqr lptasdl lqirsyvyaeepnidihnfvgtftrxx
xx-----
-----psvnes
lsi-----
-----e-----NTLWA-STVI-----
as---gtvv-----gVVLYTGRELRSVmntsnprs-----

-----kiglfdelevncltkilfgalvvvslvmv
-alqhfagr-----wylq-----iirfLLLFSNI
IPISLRVNIDMGKIVYSW-Vlrrdski-----
-----pg-----
-----tVVR-SSTIPEQLGRISYLLTDKTG-----
-----TLTQNEMVfk-----rhlhgtvay-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-----xx-xxxxxxx-xxxxxxxxmssr-vh-----
-----ea
vkaialc---hnvt-----
-----pvxxx-----

-----x-xxxxx-xxxxxx-----xxxxxx
--x-----yqasspde-valvqw---te-s-----
-----vglt--l--vgrdqs-----sm-----
-----ql-----
rtpg-xxxx-nftilqipftyesk-rmgi---i---vr-----

-----x-e-----s-----xg-----e-----
-----it--f-----y-----
-m-----k-----
-----gad
v-----vmagiv--xyx-----


```
>mgr IV_IV01 XP_369133.1
```

m—

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxaprqvga-----xx-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXX-----

```
---irfagsqd-----
```

-----XXXXXXXXXXXX-----

-----xghg|snairtsryt-----ly-----

-----df f p k q v w f q f-----

-----s-r|snfyfl---cvqip
-qti-----pgist-----tgn--f-tt---ilp
llff-v-----lltivkegydd-----yk-----rh---rl
dkvenarcat-----vlr---xxx-----

-----xxxxxxxxxxxxxxxx
xxxxxxxxxxq-ksw-----x-----d-----
xxxxxxxxx-----xx-xxx-----v
q-----
---wrdlEVGDVLRlsr-----
---NEDVPADLILVqa-----

-----enedh---xayVETMALDGETNLKSKsv-

-----panltk lasisdivqsglei vaedpnpdlnhfdgrlti--

-----agdtap
lti-----
-----n-----EVLYR--GCTL-----r
nt---paav-----gVVINTGEECKIRmnanrhpk-----

-----xkkpalektnrivltlvayvfsc tagcs
-igyllwqrstenss---wylr-----gagvavqei vvg yAIHFNNI
IPLSLYVTIELTKLFQML-MLngdiem-----
-----yheasdtp-----
-----aKCN-TNTILENLGQVGYVFSDKTG-----
-----TLTENVMQFr-----kmsiagisw-----
-----xxxxxx-----xxxxxxx
xx-----

-----xxxxx--xxxx
xxpglssad--l xeyixxxx-----
-----xxxx-----xxxx---dy
llalalc---htcl-----
-----pe---yxx-----xx---xx-----

-----yqsaspde--la|vra---aq-e---
-----lgyq--v--vqrssh-----sv-----
-----t|rxxx-----t
nggexxxxx--vyei|dvvefsskrk-rmsi----i---ir-----

-----x-p-----d-----g---r-----
-----i|---|-----i---
-c-----k-----
-----gad
s-----vi|pr|rxnxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
--xx
x--xxxxxxx--xxxxxx--xxxxxxxxxxxxxxxxxxxxxx-----xxxxxxx
xxx--xx--trc-fkhlddf--ase---glrtLVYAQKfl--sesdyaswkklysd---
at-----ts|vdrqerietvsel-leqnle|VGATAIEDKLQKGPETIDKLRRan-|KV
WMLTGDKRETA|N|AHSAR|-----ckpysdvh-----

-----i|-----dssk--xx-----

-----xxxxxxxxxxe|xxxkxxxxxxxxxx-----
-----xxhnlvvdght|g-----
-----em-----
xxx-----vh|sel|fys-----

lapvvdsv|CC--RASPAQKALLVRAvr-----
---qk--i|-----xsxxxxxxxxxxxxxLTLs|GDGGNDLAMLAEAHVGVGI--
-----sgreg|q-----

-----AARVADYS|AqfRFLARLL--LVHGRWNYSRTARFV-----L

atf-wkemy-fytgtiayqyfvgy-----tgtslyemwsltal
nlifstlctispalweqdlsat-----tllavpelytfqqrnlldvdk
y-lswmlagvaeglitf-fscwxsvg-----xxxxt-----

gdxxlyaignlafsiammwnwxliiethtknivilg-----sflitvagwwawqaf
lsgsyspsxxxxxxxx-----gltefg-----
-----rdlsw-----tc-----livvlaalivfe-----
-----mgykavk-----rq-----

-----xx-----

-----xxxxxxxxxaqaddlrxxxxxxxxxxxxxxxxxxxx
xxxxxx-----

-----xx-----

-
>aniIV_IV04 EAA60094.1

m-----

-----XXXXXXXX

XX-simdrXXXXXXXXXXXX-
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-

-----x-----x-----
---nrkvyvni-----

-----XXXXXXXXXXXX-

-----xylanypnrnkvtakyt-----pi-----
-tfvpknlfqf-----
-----q-nianvyfl-----fiiil
-gff-----sifgv-----d-n--pxln--tvp
livi-i-----vvtaikdaied-----wr-----rt--vl
dtelnspvy-----rlvXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXXXXXXXXX-xxxx-xx
XXXXXXXXXXXXXXXX--xx--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXxn-arf-----x-----r-----
-----d
y-----
---wksLQVGDFVRLyn-----
---GDPIPADIVVLst-----

-----sdpdg-a--cyVETKSLDGETNLKVRqa-----
-----lhcgrkvrhardcersefiiieseaphpnlyayngavrwx
XXXXXXXXXXXX-----
-----kemvep
iti-----
-----n-----NLLLR--GCSL-----r
nt---ewil-----gVVIFTGVETKIMlnsgetps-----

-----krpqlakdlnwnviynfiliifmcilsg
-ivngvawasdegsl-----nyfe-----xxxxxtpavtgitfwvalILFQNL
VPISLYISIEIVRTAQAI-FIhsdvfm-----

-----yydklgis-----
-----cIPK-SWNISDDVGQIEYIFSDKTG-----
-----TLTQNVMDfk-----kctvngvsv-----
-----xxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxltfispd--yxadmxxxx-----
-----xxxx-----xxxx-----hf
mlalavc-----hsvi-----
-----texxxgxx-----x-x-----xx-----

-----fraqspde--aalvgt-----ar-d-----
-----cgft--l--lgrsnd-----dl-----
-----ivn--x-----m
geer-----tytvlnlefnstrk-rmsa-----i--vr-----

-----x-p-----d-----r-----s-----
-----ir--l-----f-----
-c-----k-----
-----gad
s-----i iysrla-xg-----x-----

xxx--xx--kkt-aqhletf--are----glrtLCVADRkl--seeeyrawskehdi--
aa-----aaltdreeklenvasa-ieqdlmllGGTAIEDKLQDGVPTISLLARag-IKL
WVLTGDKVETAINIGFSCNL-----ltnemeli-----

-----vf-----nipg--xx-----rhqxxx-----
-----x
xxxx-----x-xxxxxxxxdxxxxexx--xxxxx-----
-----xxthavvidgetlkl-----
-----ml-----
x-----demkqrfl-----

lckqcksvLCC--RVSPAQKAADVVKk-----
--dg--ln-----i-----MALSIGDGANDVAMIQADVGVGI--
-----igeegrq-----

-----AAMSADYAIgqfRFLQRLI--LVHGRYSYRRLGETT-----A
nff-yknlv-wtfalfwysiyndf-----dgsylfdytyiilv
nlaftslpviimgifdqdvdk-----vs lavpqlymrgierlewsqak
f-wlhmadgfyqsvicf-ympyxlye-----xxxxxxxxxxv-----

sd--rnrngilvascaviasnty-ilmsyrwdwltvl-----inaisc liffwtgv
yssvqasaxxx-----ksaaqty-----
-----gtltfw--vv--llltvticllpr-----
-----fvvksvq-----kvff-----p-----ldv
-----xx-----

-----xxxxxxxxsddqqiyxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

-----xx
xxxxxxxxxxxxxxxxxx-----

>ggaIV_IV07 XP_416881.2

m-----

[illegible]

-----sdpdg-l---chIETANLDGETNLKQRqv-

-----vrrfleldsefdplkftsviecenpnndlsrfrgsivhx-

-----sgkkdg
lfk-----
-----e-----NLLLR-GCTl-----r
nt---eevv-----gIVIYAGHETKALInnngpry-----

-----krsklerqmnadvlwcililimclfsa
-ighglwvwqygekk---xxxfdvp-----xxxxxxspvlasvyflfitalIVFQVM
IPISLYVSiEIVKICQVY-FlhqkdI-----
-----ydeetdsq-----
-----IQCR-ALNITEDLGQVQFIFSDKTG-----
-----TLTENKMVFr-----rctvsgiey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx-xxxx
xxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxdtpdph--lxeVxxxxxxxxxxxxxxxx
xxxxxxxxxxxx-xxxx-xxxx-df
fialtic---ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxs|xxxk-x-----xxx-xxx-----
-----xxxxxx-----
-----xxxxxxxx-xxxxxx-xxxxxxxxxxxxxxxx-xx-----
-----xxxxx-----xyyeaespde--aa|vya---ar-a---
-----yncs--l--vgrlsd-----qv-----
-----svexxx-----l
gtl-----nfevlhtlgfdsirk-rmsv---v--vr-----

-----x-p-----l-----xd---e-----
-----in-v-----y-----
-t-----k-----
-----gad
s-----vimdl|lxxs-xxxxxxx-----


```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXX-----
```

```
>mgr IV_IV02 XP_366691.2
```

m

xxxxxxx

xxxxxxxkrasmgxxxxxxx

xxxxxxx

---prtl|yfnl|-----

-----XXXXXXXXXXXX-----

-----xxvdtprnkirtakyt-----pl-----

—sfipknlwlqf—

-----h-nianiyfl---flvil
xgnt-----kvfggxxxxxxxxxxxxxxxxxxxxxxxxxis---ixtrxxxpes
vispxt-----hrtsfisared-----ip-----xxxxxxxra---eg
qqnlevvpqq-----

-----xxxxxxxx
xxxxxxxxxexahi-----xxxxxx
xxxxxxxx-----xx---xxx-----d
k-----
----wknLQVGDFVRllys-----
----DDELPADIIlLat-----

-----sdpeg-a---cyIETKNLDGETNLKFRqa-

-----lkcgrnmknsrdceraqfiveseppqpnlykyngai kwxx
xxxxxxxx-----
-----remtep
iti-----
-----d-----NTLLR---GCNL-----r
nt---dwvl-----gVVLFTGHHTKIMmns gitps-----

-----krpriarelnynvlynffilfgmcllsa
-ivngfafgtsdnsi-----alfe-----xxxxxtpamngfitfwaalILFQNL
VPISLFI SIELVRLLQAF-Fl ysdvdm-----
-----yyepidqp-----
-----cIPK-SWNISDDLQIEYIFSDKTG-----
-----TLTQNVMEFk-----katingqpy-----
-----xxxxxxxxxxxxx-----

-----xxxxx---xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-lqfiapd--fxedlxxxx-----
-----xxx-----xxx-----rf
mlalalc---htvi-----
-----pexxxgxx-----x-x---xx-----

-----ykaqspde--aalvst---ar-d---
-----mgft--v--lssnsd-----gv-----
-----rln-x-----m
geek-----yypilntiefnssrk-rmsa---i---vr-----

-----x-t-----d-----g---q-----
-----tv--l-----f---
-c-----k-----
-----gad
s-----i iysrlk-xg-----x-----

xxx--xx--tdt-aqhlemf--are---glrtLCIAERvl--geqeyqawskeyav---
aa-----aavenredkmeiadq-ieqdl t lGGTAIEDRLQDGVPTIAVLAEag-IKL
WVLTGDKVETAINIGFSCNL-----lnndmell-----

-----nl-----kvde--xx-----tg|xxxx-----
-----xxxxxxxx-----
xxxx-----x-xxxxxxxxdxxxxaxx--xxxxxx-----
-----xxthavvidgftlrw-----
-----v|-----
x-----dtlkqkfll-----

lckqcksvLCC--RVSPAQKAAVCAMVk-----
--ng--ld-----v-----MTLSIGDGANDVAMIQEADVGVGI--
-----agvegrq-----

-----AVMSSDYAIAqfSFLQRLV--LVHGRWSYRRLAESI-----S


```
nff-yknlv-wamplflfqiycdf-----dmtylfdytyilmf
nllftsvpviimgvldqdvst-----vslavpqlryrgierlewtqtk
f-wlymldgtyqgvmsf-fipyxvvv-----xxxxxxxxxxv-----
```

```
td--rvrfgayiahpavvtinly-ilinsyqwdwlv|-----vvvlsdlfvffwtgv
ftsntysqxxx-----eaapqiy-----
```

-----aqpsfw---av--fiitpvmcmfpr-----

-----fsikalq-----kvyw-----p-----ydv

-----XX

XX-----

```
-----xxxxxxxxxathtrtqtxxxxxxxxxxxxxxxxxxxx
```

XXXXXXXXXXXXXXXXXXXX-----

-----XX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

```
>mgr IV_IV03 XP_361592.2
```

m-----

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXsprip|XXXXXXXXXX
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
xx-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
xxxpsfmssss-----

-----XXXXXXXXXXXXXXXXXXXX--

-----xxxxxxxxxxxxxsarfppnavsnakyt-----aw
-sf|pitlynef-----

-----s-fffnmyfl----lvals
-qai-----palri-----gyi---s-ty---iap
lafv-l-----mitlgkeahdd-----ia-----rr---rr
dseansepyt-----tiqXXXXXXXXXXXXXXXXXXXX

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXhxrev-----x-----k
a-----
---skdLKVGDLRLtk-----
---GQRVPADVILqcXXXXXXXXXXXXXXXXXXXX

-----XXXXXXXXXXXXXXXXXXXgsqag-axxtfIRTDQLDGETDWKLRia-

-----splsqnlateelvrfrvtgpkdkkvnefvgtlelx
XXXXXXXXXXXXXXXXXXXX
-----lantap
lti-----
sr-----avtl-----NTAWA-NTVI-----a
-----aVIVYTGPGQTRSAlstpsrs-----

-----ktglleyeinsltkilcaltlalsiilv
-afqgftntegnv-----wyik-----imrfLVLFSTI
VPISLRVNIDLGKSVYSW-F|qr dpgm

-----pg-----
-----aVVR-TSMIPEDLGRIEYLLSDKTG-----
-----TLTQNEMEMk-----kihigtvsy-----
-----xxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxx-xxxxx-xxxxxxxxigar-vr-----
-----dv-----
vlalalc-----hnvt-----
-----ptxxx-----

-----xxxxxxx-----
--x-----yqasspde--iaivkw--te-a--
-----vglr--l--tyrdrq-----sm-----
-----tl-----
sfsexxxxx-xhf-----

-----x-xxxxx-----g-----xg-----e-----
-----tw--f-----y-----
-q-----k-----
-----gad-----
t-----vmssiv--xax-----

-----dwl--deetanm--are-----glrtLVGRKrI--saeqyrefsryqe-----
as-----laingrdagmqkvvshxlerdleILGVTGVEDKLQKDVKPSLELLRNag-IKI
WMLTGDKVETARCAVSSKL-----vargqiy-----

-----tl-----akmk-----rtd-----

-----sxxxxxxxxxxxx-----
-----dacllidgeslal-----
-----||-----
-----qyhrldfvs-----

vavr lptvVAC--RCSPTQKAEVARLlk-----
--dy--tr-----x-----RVCCIGDGGNDVSMIQAADVGVGI--
-----vgkegrq-----

-----ASLAADFSIEqfHHLTKLL--VWHGRNSYKRSAKLA-----Q
fvi-hrgli-iavcqtmysiamhf-----epdglykdwlvgv
atmytafpvlsl-vldkdvden-----lanlypelykeltsgsrlyrt
f-fvwvlvslyqggi iq-glsq-llt-----e-----

vd--gpkmvavsftvlvlnellm-vaieittwhpvmiv-----sivgtflvymgsipf
lsgy-f-----dlkfm-----
-----itlrtmxxxxyr--kvqelmvdfllr-----
-----qpqqqvtxxxxxxxxxxxxxeskn-----pxxxxxxxxxxxxxxxxxps

-----npl-----

xxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxx-----

>ggaIV_IV08 XP_414491.2

m-----

amtaikdawed fr ry kl
dkeinhmgycys

xxd-ray x e k

c

wkdVRVGDFVQLqc

NETIPADILLlys

-----sdqng-i---chLETANLDGETNLKQRrv-

-----vmgfssqntsfepeffqnti ice l p n n d l n k f k g y-----
-----xxxx-----
-----nher ig
fni-----
-----e-----SLLLR-GCTI-----r
nt---evai-----g l V I Y A G H E T K A M l n n n g p r y-----

-----krsk i e r r m n v d i f l c v g l l f t m c l v g s
-i g h g i w s g s f e h p-----x y d v p-----xxxxxxx s p v l s g f y m f l t m l I L L Q V L
I P I S L Y V S i E L V K L G Q V F-L l h n d l d l-----
-----ydeead l p-----
-----i Q C R-A L N I T E D L G Q I Q Y I F S D K T G-----
-----T L T E N K M V F r-----r c t v d g h e f-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxx---xxx-----

-----xxxxx---xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx---xxxxx-fxxxq-x-----xxx---xxx-----
-----xxxxxx-----
-----xxxxxxxxxxxxxxxxxxx---xxx---xxxxxxxxxxxx
xxxxxxxxxx-----xxyeaespde--aa l vya---aq-a---
-----ysft--l--vsrtpe-----qv-----
-----tvrxxx-----g
t l l-----t f d i l y t l g f d s v r k-r m s v---v---vr-----

-----x-p-----l-----xk---e-----
-----i i-v-----y-----
-t-----k-----
-----gad
s-----v i m d l l e x x g-x x x x x x x x-----

[illegible]

-----h-rvanlyfl---flvvl
-nwv-----plvea-----fqk---e-it---mlp
liav-l-----titalkdgled-----ys-----ky---km
dkqinnlltk-----vys-----

-----xxe-kky-----x-----d-----
-----e
h-----
----wknVNVGDFIRLsc-----
----NEIIPADMVLLys-----

-----sdl dg-i---cyIETAGLDGETNLKQRqv-

-----vrgyseqaseidpekfsgriecespnddl nhfrgf-----
-----xxxx-----
-----skdrv g
lsk-----
-----e-----NLLLR--GCTV-----r
nt--eavv-----gIVVYAGHETKAMInnsgphy-----

-----krsklerkvnsdilwcvlllilmcltga
-ighgiwisryseia---xfnip-----xxxxxxxssmlagfnmfwtml ILLQVL
IPISLYVSiEIVKLGQIY-Llqndidf-----
-----yhektdst-----
-----iRCR-ALNIAEDLGQIQYIFSDKTG-----
-----TLTENKMVFr-----rcsiagqey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxdvvpdtq--lkekxxxxxxxxxxxxxxxx
xxxxxxx-xx-----xxx-----df
flalaic-----ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx---xxxxxplxxxkxx-----xxx---xxx-----

xxxxx—xxx—xxxx
xxxx—xxxxxxxxxxxx—xxxxxxxxxxxxxxxxxxxx—xxxxxxxxxxxx
xxxxxxx—x—xyyeaespe—aalvha—ak—a—
—ykcil—qsrtpd—qv—
—tvdx—
gsl—tfqlhllpfdsvrk—rmsv—v—vr—
—x—p—v—xn—q—
—vv—v—y—
—t—k—
—gad
s—vmmdllexs—xxxxxxx—
xxx—xx—ert—qkhlddy—ark—glrtLCIAKKvm—sdeeytewlnnhfl—
ae—tsidnreeillesair—letklitILGATGIEDRLQDGVPTIQALRKag—IKI
WMLTGDKRETAVNIAYACKL—lepddrif—
—tl—ksqs—xx—acaxxxx—
—x—
xxxx—xxxx—x—dqxxxxxxxxxxxx—xx—x—
xxxxxx—glvidgrtleh—
—vl—
x—dslqnafle—
ltekcravVCC—QATPLQKSVLVRLVr—
—nk—lk—a—MTLAVGDGANDVSMIQVADTGVGI—
—mgqegmq—
—AVMASDFAISqfRHLRKLL—LVHGHWCYTRLNMI—

```
yff-yknva-yvnllfwyqffcgf-----sgtsmtdywiliiff
nllftsvppiigyvlkdksae-----ilmqipqlvymsqksvaylpst
f-witlldafyqslacf-fvpy-fty-----xxxxx-----
```

-d--ifsfgnpintaalfiilfh-lliecksvtwihtv-----vitgsilfyifala
fgatyrth-xxxxxxx-----rimekhm-----

-----adpvfy-----lv--c||ttcval|pr-----

-----yflralq-----gtlf-----p-----ssv

-----XXXXXXXXXXXXXXXXXXXX-----

```
-----xxxxxxxxxxcrmelqvtxxxxxxxxxxxxxxxxxx
```

XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

```
>mgr IV_IV04 XP_359925.2
```

m-----

-----xxxxxxxxxxxxxxxxxxxxvarpaasxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxx-----

---grqvplsa-----

-----xxxxxxxx-----

-----xxgkpyisnfirssryt-----iw-----
-df|prqlvfqf-----
-----m-kianfyfl---iail
-qli-----pglsp-----vaxxxxgap
livf-v-----afsmakegydd-----yr-----ry---kl
dlvenrssaw-----vldxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxnxwsh-----
-----v
q-----
---wqdlRVGDVVRLqr-----
---DEQVPADLVLLsa-----

-----sgtng-i---aylDTMALDGETNLKSKqa-----

-----xpllakrcgtvagichcdatviaedpnldiysfdgsrvv-----

-----gdktmp
ltr-----
-----d-----QVFR--GSTM-----r
nt---reay-----gLVINSGEECKIRmnaahksvr-----

-----xkhpamqavtnrivlllivvlavglk
-igndefeae fgptn---wymf-----gvr|siseqvfgf|ILLNTL
IPLSLYISIEAIKIGQLY-MLq-diem-----

-----ydaesntp-----
-----iVAN-TTTILENLGQVSYIFSDKTG-----
-----TLTENVMRFq-----klslggyvw-----
-----xxxxxxxxxxxx-----

-----telqtlg--lxqhlxxxx-----
-----xxx-----xxx-----hf
ilcmalc-----ntcl-----
-----pe--txx-----xxx--xx-----

-----yqaaspde--lalina--ar-e-----
-----lgyv--m--idrdse-----ti-----
-----klqxxx-----s
gsndxxxx--tytildvieftsdrrmsv--i--lg-----

-----x-p-----e-----g--r-----
-----i|---|-----|-----
-s-----k-----
-----gad
s-----alprlrxxqxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxx-----
xxx--xx--eac-frhiedf--ase--glrtLLFSYRyi--eeadyvawkreyhe--
ae-----tslvdrqaridsvaek-ielelelAGITAIEDKLQDGPETIDKLRRan-IKV
WMLTGDKRETAIIGHSAKI-----cqpfsdif-----

-----il-----dasaxxx-----

-----xxxxxxxxxxevxx-----xxx-----
-----xhsvvvidgltl-----
-----ev-----
xxx-----kaskdlfyd-----

m-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxsladqe-----

--xvrtifinq-----

-----xx-----

-----ltkfcnnhvtakyn-----ii-----

-tflprflysqf-----

-----r-raansffl----fiall

-qqi-----pdvsp-----tgr--y-tt--lvp

llfi-l-----avaaieiied-----ik-----rh--ka

dnavnkkqtq-----vlr-----

-----n-gaw-----x-----i-----

-----v-----

h-----

-----wekVAVGEIVKVtn-----

-----GEHLPADLISLss-----

-----sepqa-m---cyIETSNL DGETNLKIRqg-

-----lpatsdikdvdsImrisgriecespnrhlydfvgnirIx-

-----ghgtvp
lga-----
-----d-----QILLR-GAQL-----r
nt---qvvh-----gIVVYTGHD TKLMqnstsppl-----

-----klsnveritnvqililfciliamslvcs
-vgsaiwnrrhsgkd-----wyn-----xxxggasnfgl nftfllFNNL
IPISLLVTIEVVKFTQAY-Flnwdldm-----
-----hyeptdta-----
-----aMAR-TSNLNEELGQVKYIFSDKTG-----
-----TLTCNVMQFk-----kctiagvay-----
-----xxxxxxxxxxxxxxxx-----

-----xxxx
xxxxxx-----ktfsdss--lxenlxx--x-----
-----xxxx-----xxxx-----ef
ltmmavc---htav-----
-----pexxxdx-----xx-----

-----yqaaspde-galvra---ak-q---
-----lnfv--f--tgrtpd-----sv-----
-----iid--x-----l
gqee-----ryelInvleftsark-rmsv---i--vr-----

-----x-p-----s-----g--k-----
-----lr--l-----y-----
-c-----k-----
-----gad
t-----viydrIa-----x-----

xxx--xx--eit-lkhleqf--ate---glrtLCFAVAei--sesdfqewravyqr---
as-----tsvqnrllkleesyel-ieknlqilGATAIEDKLQDQVPETIETLMKad-IKI
WILTGDKQETAINIGHSCKL-----lknmgmi-----

-----vi-----negs-----ldgxxx-----
-----xxxxxxxxxalxx-----
-----xxdfaliiidgktlky-----
-----al-----
x-----fgvrqyfld-----

lalsckavICC--RVSPLOKSEVVMVk-----
--kq--v-----xv-----VTLAIGDGANDVSMIQTAVGVGI--
-----sgneglq-----

-----AANSSDYSIAqfKYLKNLL--MIHGAWNYNRVSKCI-----L
ycf-ykniv-lyiieiwfafvngf-----sgqilferwcigly
nvmftamppltlgi ferscrke-----nmlkypelyktsqnaIdfntkv
f-wvhcIngIfhsvilf-wfplxalq-----xxxxxxxxxt-----

sd--ylllgnfvytfvvitvcl k-agletsywtwfshi-----aiwgsialwvffgi
ysslwpaixxxxxx-----geaamlf-----
-----ssgvfw--mg--llfipvasllld-----
-----vvykvik-----rtaf-----k-----tlv
-----xxxxxxxx-----

-----xxxxxxxxxkslteraqxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

XXXXXXXXXXXXXXXXXXXXXXX

-

>hsaIV_IV03 NP_005594.1

m-

XXXXXXXXXX

XXXnreaeenXXXXXXXXXX--

--twqvkand-

-----XXXXXXXXXX-----

-----xxxxxxeskyannaiktykyn-----af---

-tfipmnlfeqf-

-----k-raanlyfl---allil
-qav-----pqist-----law--y-tt---lvp
llvv-l-----gvtaikdlvdd-----va-----rh---km
dkeinrntce-----vik-----

-----d-grf-----x-----v-----
-----a
k-----
---wkeIQVGDVIRLkk-----
---NDFVPADILLss-----

-----sepns-l---cyVETAELDGETNLKFKms-

-----xeitdqylqredtlatfdgfieeepnnrldkftgtl fw--

-----rntsfp
lda-----
-----d-----KILLR--GCVI-----r
nt---dfch-----gLVIFAGADTKIMknsgktrf-----

-----krtkidylmnymvytifvllillsagla
-ighayweaqvgnss---wlyl-----xxxxxtpsyrghliffwgyllVLNTM
VPISLYVSvEIRLGQSH-Flnwdlqm-----
-----yyaekdtp-----
-----aKAR-TTTLNEQLGQIHYIFSDKTG-----
-----TLTQNIMTFk-----kccingqiy-----
-----xxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxx-----lafydhy--lxeqixx--x-----
-----xx-----xxxx--qf
ffllavc---htvm-----
-----v---dxx-----xxx---xx-----

-----yqaaspde--galvna----ar-n-----
-----fgfa--f--lartqn-----ti-----
-----tis-x-----l
gter-----tynvlaifdfnsdrk-rmsi----i--vr-----

-----x-p-----e-----g--n-----
-----ik--l-----y--
-c-----k-----
-----gad
t-----viyerlh-----x-----

xxx--xx--qet-qdaldif--ane----tlrtLCLCYKei--eekeftewnkkfma---
as-----vastnrdealdkvyee-iekdlilLGATAIEDKLQDGPETISKLAkad-IKI
WVLTDGKKETAENIGFACEL-----ltdttic-----

-----yg-----edin--xx-----lhaxxxx-----
-----xxxx-----
-----xxx yaxxxpxxxxxxx-xx-----
-----xxnralii tgswlne-----
-----i lxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
x-----eqrqknfvd-----

lacecsavICC--RVTPKQKAMVVDLVk-----
---ry--kk-----a-----ITLAIGDGANDVNMIKTAHIGVGI--
-----sgqegmq-----

-----AVMSSDYSFAqfRYLQRLL--LVHGRWSYIRMCKFL-----R

```
yff-yknfa-ftlvhwysffngy-----saqtayedwfitly
nvlytslpvlimglldqdvdk-----lslrfglyivgqrdllfnykr
f-fvslhgvltsmilf-fiplxayl-----xxxxxxxxxp-----
```

```
sd--yqsfavtiasalvitvnfq-igldtsywtfvnaf-----sifgsialyfgimfd
fhsagihvxxxxxxxxxx-----gtasnal-----
```

-----rqp*y*w----lt--i i lavavclpv-----

-----vairfls-----mtiw-----p-----ses

-----XXXXXXXXXX-----

-----xxxxxxxxxqvfrrgvsxxxxxxxxxxxxxxxxxxxx

XXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXX-----

>hsaIV_IV04 NP_065185.1

m-----

xxxxxxx--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkkrppee-----

---errarand-----

-----xxxxx-----

-----kfqyasnciktskyn-----il-----
-tflpvnlfef-----
-----q-evantyfl----fllil
-qli-----pqiss-----lsw--f-tt----ivp
lvlv-l-----titavkdatdd-----yf-----rh--ks
dnqvnrrsq-----vli-----

-----n-gil-----x-----q-----
-----e
q-----
---wmnVCVGDIIKLen-----
---NQFVAADLLLLss-----

-----sephg-l---cyIETAELDGETNMKVRqa-

-----xpvtselg-disklakfdgeviceppnnldkfsgtlyw--

-----kenkfp
lsn-----
-----q-----NMLLR--GCVL-----r
nt---ewcf-----gLVIFAGPDTKLMqnsgrtkf-----

-----krtsidrlmntlvlwifglvcmgvila
-ignaiwehevgrf---xvylp-----xxxxxsaffsgflsfwsylllLNTV
VPISLYVSvEVI RLGHsy-Flnwdkkm-----

-----fcmkkrtp-----
-----aEAR-TTTLNEELGQVEYIFSDKTG-----
-----TLTQNIMVFh-----kcsinghsy-----
-----xxxxx-xxxxxxxxxxxxx-----

-----xxxxx-xxxx
xxxxx-----flfwdps--lxeavxx-x-----
-----x-----xxxx-----ef
frllslc-----htvm-----
-----se--exx-----xxx--xx-----

-----ykaqspde--galvta----ar-n-----
-----fgfv--f--rsrtpk-----ti-----
-----tvh--x-----m
gtai-----tyqllaildfnnirk-rmsv----i--vr-----

-----x-p-----e-----g--k-----
-----ir--l-----y-----
-c-----k-----
-----gad
t-----i lldr lh--h-----x-----

xxx--xx--ntt-mdhlney--age----glrtLVLAYKdl--deeyyeewaerrlq--
as-----laqdsredrlasiyee-vennmmlLGATAIEDKLQQGVPETIALLTLan-IKI
WVLTGDKQETAVNIGYSCKM-----ltdmtev-----

-----fi-----vtgh--xx-----levxxxx-----
-----xxxx-----xxxx-----xx
xxxx-----xxxxxxxxxxxxsxxxtxx-----xxxx-----
-----xxeyalvinghs lah-----
-----a l-----
x-----admele fle-----

[illegible]

-----tepss-l---cyVETVDIDGETNLKFRqa-

-----xmvthkelatikmasfggtvtceapnsrmhhfvglew-

-----ndkkys
ldi-----
-----g-----NLLLR-GCRl-----r
nt---dtey-----gLVlYAGFDTKlMkncgkih|-----

-----krtkldllmnklvvvifisvvlvclvla
-fgfgfsvkefkdh-----yyls-----xxxxsvaaesffvfwsfLILLSVT
lPMSMFIlsEFiYLGNSV-Fldwvqm-----
-----yykpqdv-----
-----aKAR-STSLNDHLGQVEYlFSDKTG-----
-----TLTQNlLTFn-----kccisgrvy-----
-----xxxxxxxxxxxxx-----

-----x---xxxx
xxxxx-----l|fhnaa--lxh|vxx--x-----
-----xx-----xxxx---ef
wrllaic---htvm-----
-----vrxxxrxx-----xxx---xx-----

-----yqaaspde--galvta---ar-n---
-----fgyv--f--lsrtqd-----tv-----
-----tim--x-----l
geer-----vyqvlaimgfnstrk-rmsv---l---vr-----

-----x-p-----e-----g-----a-----
-----ic--l-----y-----
-t-----k-----
-----gad
t-----viferlh-----x-----

xxx--xx--fat-eealaaf--aqe----t|rtLCLAYRev--aediye dwqqrhqe---
as-----|l|qnraqalq-----q|LGATAIEDRLQDGV PETIKCLKKsn-|KI
WVLTGDKQETAVNIGFACEL-----|senm|l|-----

-----ee-----keis--xx-----letxxxx-----

-----xx-----n|xxxexxx-----
-----xxklalvingdfldkxxxx
xxxxxxxxxxxxxxxx-awxx
x-----vlqerafvd-----

laskcqav|CC--RVTPKQKAL|VALV|k-----
--ky--hq-----v-----VTLA|GDGANDINMIKTADVGVGL--
-----agqegmq-----

-----AVQNSDFVLGqfCFLQRLL--LVHGRWSYVR|CKFL-----R
yff-yksma-smmvqvwfacyngf-----tgqplyegwflalf
nllystlpvlyiglfedvsae-----qsl ekpelyvvgqkdel fnywv
f-vqai ahgvttslvnf-fmtlx|sr-----xxxxxxxf-----

sd--hqsfavvvalsc|lsitme-viliikywtalcva-----tillslgfyaimttt
tqsfw|frxxxxxxxxx-----yad|svm-----
-----sspsil----lv--vllsvsintfpv-----
-----lalrvif-----
-----xxxxxxxxxxxxxxxx-----

-----xxxxxxxxxphvhresrxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxx-----

XXXXXXXXXXXXXXXXXXXX

>hsaIV_IV06 NP_079113.2

[illegible]

-----xxxekklrev-----

---er i vkand-----

XXXXXX

-----kfqyadnr ihtskyn-----i l-----

-tf|pin|feqf-----

-----tf|pin|feqf-----

-----q-rvanayfl---cllii
-qli-----peiss-----ltw--f-tt---ivp
lvlv-i-----tmtavkdatdd-----yf-----rh---ks
dnqvnnrqse-----vli-----

-----n-skl-----x-----n-----
-----e
k-----
---wmnVKVGDIIKLen-----
---NQFVAADLLLLss-----

-----sephg-l---cyVETAELDGETNLKVRha-

-----xsvtseIgadISRlagfdgIvcevpnnkldkfmgilsw--

-----kdskhs
Inn-----
-----e-----KIILR--GCIL-----r
nt---swcf-----gMVIFAGPDTKLMqnsqtkf-----

-----krtsidrlmntlvlwifgfliclgiila
-ignsiwesqtgdqf---xtflf-----xxxxxxssvfsgfltfwsylllLNTV
VPISLYVSvEIRLGHSY-Flnwdrkm-----
-----yysrkaip-----
-----aVAR-TTTLNEELGQIEYIFSDKTG-----
-----TLTQNIMTFk-----rcsingriy-----
-----xxxxx-xxxxxxxxxxxxx-

-----xxxxx--xxxx
xxxxx-----fqffdhh--lxesixx--x-----
-----x-----xxxx--ef
lrllalc---htvm-----
-----se--exx-----xxx--xx-----

-----yqvqspde--galvta---ar-n---
-----fgfi--f--ksrtpe-----ti-----
-----tie-x-----l
gtlv-----tyqllafldfnntrk-rmsv---i---vr-----

-----x-p-----e-----g---q-----
-----ik--l-----y---
-s-----k-----
-----gad
t-----ilfeklh-p-----x-----

xxx--xx--slt-sdhlsef--age---glrtLAIAyRdl--ddkyfkewhkmled---
an-----aateerderiaglyee-ierdlmILGATAVEDKLQEGVIETVTSLSLan-IKI
WVLTGDKQETA INIGYACNM-----ltdmndv-----

-----fv-----iagn--xx-----vevxxxx-----
-----xxxx-----xxxx-----xx
xxxx-----xxxxxx--xekxxx|xxxxxxxxxxx-----
-----xxdya|inghs|ah-----
-----al-----
x-----sdvkndlle-----

l acmcktv ICC--RVTP LQKAQVV ELV k-----
--ky--rn-----a-----VTLAIGDGANDVSMIKSAHIGVGI--
-----sgqeg|q-----

-----AVLASDYSFAqfRYLQRLL--LVHGRWSYFRMCKFL-----C

-----xxxxxxqpvrqkxxxx-----
-----xxxxxxxxxxxxxxxxxxxxx-----

-----prtvwlgh-----

-----xxxxdqryprnvinnqkyn-----ff-----
-tflpgvlfngf-----

-----k-yffnlyfl----llacs
-qfv-----pemrl-----gal--y-ty---wvp
lgfv-l-----avtvireavee-----ir-----cy---vr
dkevnsqvys-----rilt-----

-----axgtv-----k-----

-----v
k-----
---ssnlQVGDLIIvek-----
---NQRVPADMIFLrt-----

-----sekng-s---cfLRDQLDGETDWKLrp-----

-----vactqr lptaadllqirsyvyaeeptidihnfvgtftrxx
xx-----

-----ppises
lsi-----

-----e-----NTLWA-GTVV-----
as-gttvv-----gVVLYTGRELRSVmtnsnprs-----

-----kigldlevncltkilfgalvvvsvmv
-alqhfagr-----wylq-----iirfLLLFSNI
IPISLRVNIDMGKIVYSW-Vlrrdski-----

-----pg-----
-----tVVR-SSTIPEQLGRISYLLTDKTG-----
-----TLTQNEMIFk-----r l h l g t v a y-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-----xx-xxxxxxx-xxxxxxxxmssr-vh-----
-----ea
vkaialc-----hnvt-----
-----pvxxx-----

-----x-xxxxx-xxxxxx-----xxxxxx-----
--x-----yqasspde-valvqw-----te-s-----
-----vglt--l--vgrdqs-----sm-----
-----ql-----
rtpg-xxxx-nftilqifpftyesk-rmgi----i--vr-----

-----x-e-----s-----xg-e-----
-----it-f-----y-----
-m-----k-----
-----gad
v-----vmagiv-xyx-----

-----dwl-eeecgnm-are----glrvLVAKKsl-aeeyqdfearyvq-----
ak-----lsvhdrs|kvatvies-lememe|LCLTGVEDQLQADVRPTLETLRNag-IKV
WMLTGDKLETATCTAKNAHL-----vtrnqdiH-----

-----vf-----rlvt-----nrg-----

-----xxxxxxxxxxxxx-----
-----dcalvisgdslev-----
-----cl-----
-----kyeyefme-----

$m-$

[illegible]

-----sekag-s---cfIRTDQLDGETDWKLKva-

-----vsctqqlpalgdIfsIsayvyaqkpqmdihsfegtfrxx
xx-----
-----ppihes
lsi-----
-----e-----NTLWA-STIV-----
as---gtvi-----gVVIYTGKETRSVmntsnpkn-----

-----kvglldlelnrltkalfalvalsivmv
-tlqgfvgp-----wyrn-----lfrfLLLFSYI
IPISLRVNI DMGKAVYGW-MMmkdeni-----
-----pg-----
-----tVVR-TSTIPEELGRLVYLLTDKTG-----
-----TLTQNEMIFk-----rhlgtvsy-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-xxxxxxxxxx-xxxxxxx-xxxxxxxxvssr-ih-----
-----ea
vkaivlc---hnvt-----
-----pvxxx-----

-----xx-xxxxxxxxxxxxx-----xxxxxx
--x-----yqasspde-valvqw---te-s-----
-----vglt--l--vsrdlt-----sm-----
-----ql-----
ktps-xxxx--sfciqlfpftsesk-rmgv---i--vr-----

-----x-e-----s-----xa-e-----
-----it--f-----y-----
-m-----k-----
-----gad
v-----amspiv--xyx-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).

This image shows a handwriting practice sheet. At the top left, there is a dashed lowercase letter 'm' for tracing. Below this, the page is filled with 12 sets of horizontal lines. Each set consists of a solid top line, a dashed middle line, and a solid bottom line, providing a guide for letter height and placement.

-----xxxxxxxxxxxxx-----xr r r r egr-----

---trtvrsnl-----

XXXXXXXXXXXXXXXXXXXX

```
-----xxxxxxaqh|adnr|kttkyt-----||-----
```

—sf|pkn|feqf—

-----h-rpanvyfv---fiall
-nfv-----pavna-----fqp--g-la---lap
vlfil-----aitafrdlwed-----ys-----rh---rs
dhkinhlgl-----vfs-----

-----xxe-kky-----x-----n-----
-----r
f-----
----wkeIHVGDFVRLrc-----
----NEIFPADILLss-----

-----sdpdg-l---chIETANLDGETNLKRRqv-

-----vrgfselvsefnplfttsviecekpndlsrfrgci ihx-

-----ngkkag
lyk-----
-----e-----NLLLR--GCTL-----r
nt---davv-----gIVIYAGHETKALInnsgpry-----

-----krsklerqmcndvlwcvlllvcmslfsa
-vghglwiwryqekk---xxfyvp-----xxxxxxspvtaavysfltmlIVLQVL
IPISLYVSiEIVKACQVY-FInqdmql-----
-----ydeetdsq-----
-----IQCR-ALNITEDLGQIQYIFSDKTG-----
-----TLTENKMVFr-----rctvsgvey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxd iptdpk--l xekxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxx-----xxxxx-----df
fialtic-----ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx--xxxxs lxxxk-x-----xxx-----xxx-----

-----xxxxxx-----
-----xxxxxxxxxxx-----xxx-----xxxxxxx-----
-----xxxxx-----xyyeaespe--aa|vya---ar-a-----
-----yncv--l--ver|hd-----qv-----
-----svexxx-----l
grl-----tfel|htlgfdsvrk-rmsv---v---ir-----
-----x-p-----l-----xd-e-----
-----in-v-----y-----
-t-----k-----
-----gad
s-----vvmdllqxs-xxxxxxx-----

xxx--xx--skt-qnylnvy--aae---glrtLCIAKRvl--skeeyacw|qshle--
ae----sslenseellfqsaair-letnlhlLGATGIEDRLQDGPETISKLRQag-LQI
WVLTGDKQETAVNIAYACKL-----ldhdeevi-----

-----tl-----nats--xx-----acaxxxx-----
-----x-----
xxxx-----xxxxx---xxraxxtxxxxxxxxxxxxxxxxxxxxx
xxxxxx-----slvidgrslay-----
-----al-----
x-----knledkf|f-----

lakqcrrsvLCC--RSTPLQKSMVVKLVR--
--sk--lk-----a-----MTLAIGDGANDVSMIQADVGVGI--
-----sgqegmq-----

-----AVMASDFAVPkFRYLERLL--ILHGHWCYSRLANMV-----

-----rreyexxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxx-----

-----xxxxxxx-----
---srtiyvgh-----

-----xxxxxxxxx-----

-----pqr fpdnr ivsskyt-----fw-----
-nfipknlfeqf-----
-----r-r ianfyfl---i i l l l
-qli-----id-tp-----tsp--v-ts---glp
l lfv-i-----tvtaikqgyed-----wl-----rh---ka
dnamnqcpvh-----fiq-----

-----h-gkl-----x-----r-----
-----k
q-----
---srkLRVGDI VMVke-----
---DETFCDL IFLss-----

-----srgdg-t---cfVTTASLDGESSHKTHya-----

-----vqdtkafhsege idal hatieceqpqpdlykfvgri nvxx
xxx-----
-----eptarp
lgs-----
-----e-----NLLLR--GATL-----k
nt---ekif-----gVAIYTGME TKMAl nyqsksq-----

-----krsaveksmnvflivylciliskalint
-vlkyvwqseprde---xwynq-----xxxxxxxnqflqaf tdf lafMVLFNyl
IPVSMYVTvEMQKFLGSY-FLtwdeem-----

-----fdedtgeg-----
-----pLVN-TSDLNEELGQIEYVFTDKTG-----
-----TLTENNMEFv-----eccieghvy-----

-----xxxxxxxxlhdctgixxixsspxxxx-----
-----xxxx-----lf
fralcic-----htvq-----xxxx-----
-----xxxxxxxx-q|xxxxsx-----

-----yisspde-valveg-----iq-r-----
-----lgyt-y-lclkdn-----ym-----
-----eilxx-----e
nnre-----kfellevlsfdsivr-rmsv-----i-vk-----

-----s-----s-----xg-----d-----
-----if-l-----f-----
-c-----k-----
-----gad
s-----sifprvkxxk-----

-----xdqi-rsrvern-ave-----glrtLCVAYKkl-taeeyснаqkmlqn-----
ak-----lalqdrekklaevyek-ierdfiILGATAVEDRLQEKAADTIEALQKag-IKV
WVLTGDKMETAAATCYACKL-----frntqil-----

-----el-----ttkk-xx-----eqsxxxx-----

-----xxxxxxxxhsxxxtxxxxxxxx-----
-----xxdygliidgaalsl-----
-----im-----xxxxxxx
x-----gnyrelfle-----

icrncsavLCC--RMAPLQKAQIVKLlk-----
---ls--ke-----xp-----ITLAIGDGANDVSMILEAHVGIGI--
-----igkegrq-----

-----AARNSDYAIPkfKHLKKML--LVHGHFYVRISELV-----Q
yff-yknvc-fifpqflyqffcgf-----sqqpdytayltly
nisftslpillyslmeqhvsad-----tlkrepslyrdvaknallrwa
f-iywtflgvfdavvff-fgayxlf-----xxxxxxxxxm-----

fg--nwtfgtlvftvlvftvtlk-laldthywtwinhf-----miwgsllfyivfsl
wggiiwpf-xxxxxxx-----yvfmqml-----
-----ssgpaw---lg--iillitvslld-----
-----vkkvlc-----rqlw-----p-----tat
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxndcsnspaxxxxxxxxxxxxxxxxxx
xxx-----

>ggaIV_IV12 XP_420240.2

m-----

[illegible]

sstdg-tcyVTTASLDGESNFKTHya
vrddtvlotdeaidsltatieceqpqpdlykfvgrimxx
xxx
epvars
lgp
e NLLLK GATL k
ntkk iy gVAVYTGME TKMA lnyqgksq
krsaveksinaflivylcillskatvct
tlkyvwqsnpfnde xwyne xxxxxxxxfkv lrmftdf lsfMVLNF I
IPVSMYVTvEMQKFLGSF Flswdkem
ydeemeeg
aLVN TSDLNEELGQVEFVFTDKTG
TLTENSMEFi eccidghky
xxxxxxdgsfqtdxxl-kyxxxxxx
xxxx lf
lralclcl htvr xxxx
xxxxxxxghxxxkxx
yisspde ialvkgaek
ygft f lglend fv
kirxx k
nete myql lhtlnfdpvrrrmsv i vr
t t xg k
||| f
ck gad
s si fprvqxxe

A series of horizontal lines for handwriting practice, consisting of solid top and bottom lines with a dashed midline.

m

-----XXX-----XXXXX

X-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

[illegible]

-----XXXX-----

-----XXXXXXX-----

---grvvfpnn-----

-----XXXXXXXXXXXX-----

```
-----rrypgnrtcttkyt-----lf-----
```

-----tf|prnl|eqf-----

-----h-rwanlyfl---flvil
-nwm-----psmev-----fhr---e-it---mlp
laiv-l-----fvimikdgmed-----fk-----rh---rf
dkaincsnir-----iye-----

-----xxe-qty-----x-----q-----
-----k
c-----
----wkdVRVGDFIQMkc-----
----NEIVPADILLfs-----

-----sdpng-i---chLETASLDGETNLKQRcv-

-----vkgfsqqevqfepeIfhntivcekpnnhlnkfkgyemhx-

-----dqtrtg
fgc-----
-----e-----SLLLR--GCTI-----r
nt---emav-----gIVIYAGHETKAMInnsgpry-----

-----krskierrmnidiffcigililmcliga
-vghsiwngtfeehp---xfdvp-----xxxxxxpsalggfymfltmlILLQVL
IPISLYVSIELVKLGQVF-FLsndldl-----
-----ydeetdls-----
-----iQCR-ALNIAEDLGQIQYIFSDKTG-----
-----TLTENKMVFr-----rctimgsey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxdvtpdkn--lxtkvxxxxxxxxxxxx
xxxxxxx-xx-----xxxx--df
flaltic---nsvm-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx---xxxx-fxxxaxx-----xxx---xxx-----

[illegible]

```

yyl-yknvc-yvnllfwyqffcgf-----ssstmidywqmiff
nlffts|ppl|vfgvldkdisae-----tllalpelksgqnsecynlst
f-wismvdafyqsl|cf-fipy-lay-----xxxxx-----

```

```
-d--vftfgtpintislttillh-qamenktwtifhgv-----vllgsflmyflvsll
ynatcvic--xxxxxxx-----wvmegql-----
```

```
-----snptfy-----lv--cf|tpvval|pr-----
```

-----yffls|q-----gtcg-----k-----s|i

-----XXXXXXXXXXXXXXXXXXXX-----

-----xxxxxxxxxxpvpeva-----xxxxxx

XXXXXXXXXXXXXXXXXXXX-----

--XX--XXXXX

XXXXXXXXXXXXXXXXXXXXX-----

>hsaIV_IV11 NP_065186.2

m-----

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxtpklsg

---hrivvphi-----

-----xxxxxxxxx-----

-----gayvnnrirttkyt-----||-----
-nfvpvrnlfeqf-----
-----h-raanlyfl----flvv|
-nwv----plvea-----fqk--e-it--mlp
lvvv-l-----tiaikdgled-----yr-----ky--ki
dkqinnlitr-----vys-----
-----xxe-kky-----x-----d-----r
c-----
---wkdVTVGDFIRLsc-----
---NEVIPADMVLLfs-----
-----tdpdg-i---chIETSGLDGESNLKQRqv-----
-----vrgyaeqdsevdpekffsricespnndlsrfgrgf-----
-----xxx-----nkervg
lsk-----NLLLR-GCTI-----r
nt-eavv-----glVVYAGHETKAMInnsgpry-----
-----krsklerantdvlcwmllvimcltga
-vgghiwlrsryekmh-xfnvp-----xxxxxxxspilagfywfwtmII LLQVL
IPISLYVSIEIVKLGGIY-FIQsdvdf-----

-----ynekmdsi-----
-----vQCR-ALNIAEDLGQIQYLFSDKTG-----
-----TLTENKMVFr-----rcsvagfdy-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxx-xxxxxxxxxxxxxxxx-----

-----xxxx-xxxx
xxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxdvpdtr--lxdkfxxxxxxxxxxxx
xxxxxx-xx-----xxx-----df
fialaic-----ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx-----xxxxs|xxxkxx-----xxx-----xxx-----
-----xxxxx-----xxxxxx
xxxx-xxxxxx-x-----xxxxxxxxxxxxxxxxxxxx-xxxxxxxxxx
xx-xxxxx-----xyeaspde-aalvya--ar-a--
-----yqct--l--rsrtpe-----qv-----
-----mvdxxx-----l
gpl-----tfqlh|lpfdsvrk-rmsv--v--vr-----

-----x-p-----l-----xn--q-----
-----vv--v-----y--
-t-----k-----
-----gad
s-----vimellsxss-xxxxxxxx-----

xxx--xx--ekt-qkhlddy--akq--glrtLCIAKKvm--sdteyaewlrnhfl--
ae-----tsidnreel|lesamr-lenkl|t|LGATGIEDRLQEGVPESIEALHKag-|K|
WMLTGDQKETAVN|AYACKL-----lepddklf-----

-----il-----ntqs--xx-----acgxxxx-----
-----x
xxxx-----xxxx-x-axxxvxxxxxxxxxx--xx--x
xxxxxx-----gliitgktlef-----
-----a|-----
x-----es|qkqfle-----

-----XXXXXXXXXX-XXX-----
-----XXXXXXXX-----
--srtiyvgh-----
-----XXXXXXXXXXXX-----
-----pqrypdnrivsskyt-----fw-----
-nfipknlfeqf-----r-rvanfyfl----iiflv
-qli-----id-tp-----tsp--v-ts---glp
lffv-i-----tvtaikgyed-----wl-----rh---ka
dnamnqcpvh-----fiq-----
-----h-gkl-----x-----r-----
-----k-----
q-----
--srkLRVGDIVMVke-----
--DETFCDLIFLss-----

A series of horizontal lines for handwriting practice, consisting of a solid top line, a dashed middle line, and a solid bottom line, repeated five times.

>spoIV_IV01 NP_593720.1

m

-----XXXXXXXXXXXXXXXXXXXX

[illegible]

---frv iqvgq

-----xepqygnavntkyd-----lf-----

-tf|pkc|yeqf-----

r-yfynmyfl-lvs
 -qli-pplki-gyl-s-ty-ia
 lifv-l-litltkeavdd-lk-rr-rr
 dsyanneyt
 xdxpca
 aqnlQAGDVVYlak
 DQRIPADMILlet
 tv-g-n-xafIRTDQLDGETDWKLrip
 csnghtegivhadapiksvhhfygtftl
 nnqkrp
 isv
 d-HTLWA-NTVL
 as-dgvy-gVVVYTGKDTRQSmnsskakt
 kvgllekeinfyskilctfvlvlisigt
 -fshgiktd-wyis-vfryLILFSSI
 IPINLRVNIDLAKIVHSK-NTesdpnl
 pg
 vVVR-SSNIPEELGRIEYVLTDKTG
 TLtQNEMEMk-klhvgtmgf
 xxxxxxxxxxxxxxx
 xxxxxxxxdsktlvr
 nl
 vlalslc-hnvt
 psxxxdxxxx


```
fvi-hrgll-isvcqvvysvisaf-----epialfqglllvgy
stmytmlpvfsi-vydrdvsek-----lvflfpelykemreqkcfisykn
f-iscvlisvyglliqxftfyxigf-----
```

-----ak|qr-----

>hsaIV_IV13 NP_055431.1

-----xxxxxx-xxx-----

-----xxxxxxxx-----
---trtiyvan-----

-----xxxxxxx-xx-----

-----pqkfidnr i isskyt-----vw-----
-nfvpkn l feqf-----
-----r-rvanfyfl---i i flv
-qlm-----id-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ns
dnevngapvy-----vvr-----

-----s-ggl-----x-----k-----
-----t
r-----
---skn lRVGD lVR l ak-----
---DE lFPADLVLLss-----

-----dr l dg-s---chVTTASLDGETNLKTHva-

-----vpetal lqtvan ldt l vaviecqpead l yrfmgrmi i xx
xx-----
-----eeivrp
l gp-----
-----e-----SLLLR--GARL-----k
nt---ke i f-----gVAVYTGMEtKMA l nyksksq-----

-----krsaveksmntfl i i y l v i l i seavist
-i l kytwqaeekwde---xwynq-----xxxxxxxskilrfisdf l afLVLYNFI
IPIsLYVTvEMQKFLGSF-Flgwd l d l-----

-----yheesdqk-----
-----aQVN-TSDLNEELGQVEYVFTDKTG-----
-----TLTENEMQFr-----ecs ingmky-----

-----xxxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxrtspenexxlxkeh-----
-----lf
fkavslc-----htvq-----xxxx
xxxxxxxxxxxxxn|xxxqxx-----

-----yyasspde--kalvea--aa-r-----
-----igiv--f--ignsee-----tm-----
-----evkx-----l
gkle-----rykl|hi|efdsdrr-rmsv--i--vq-----

-----xxxg--e-----
-----kl--l-----f-----
-a-----k-----
-----gae
s-----silpkcixxex-----

-----ekt-rihvdef--alk--glrtLCIAYRkf--tskeyeeidkrife--
ar-----talqqreeklaavfqf-iekdl|LGATAVEDRLQDKVRET|EALRMag-IKV
WVLTGDKHETAVSVSLSCGH-----fhrtmnil-----

-----el--xnqks-----dsexxxx-----

-----xxxxxxxxxdh-----
-----xxqhglvvdgts|sl-----
-----al-----
-----rehek|fme-----

m-

-----xx-----
-----xxxxxxxxxxxxxxx-----xxxxvyr l ad rxxxxx---xxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxx-----
-----x-----x-----
---prtlyfgl-----
-----xxxxxxxxxxx-----
-----xxkrwfp rnkirtakyt-----pi-----
-dfipkniflqf-----
-----q-nvanlffl---flvil
-qsi---sifge-----qvn---pxla---avp
livv-v-----gitavkdaied-----fr-----rt---ml
dihlnntptl-----r l sxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----xxxxxxxxx
xxxx---xxxxxxxxxxx-xxxxxxxxxxx-xxxx-----xxxxxxxxx
xxxxxxxxxxxxxxxx---xx---xxx-----xxxxxxxxxxxxxxxxxxx
-xxxxxxxxxe-chf-----x---k-----
-----t
y-----
---wkdVRVGDFVKVmd-----
---NDEIPADIVIIns-----

[illegible]

-----XX--

m-----

-----XXXXXXXXXXXX-----

-----XXXXXXXXXX-----

---trtvfvgn-----

-----X-XXXXXXXXX-----

-----aqr fcdnr i vsskyt-----lw-----

—nf|pkn|feqf—

-----r-rianfyfl----iiflv
-qvt-----vd-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----cl-----rh---ra
dnevnkstvy-----i ie

-----n-akr-----x-----r-----k
e
---sekIKVGDDVEVqa
---DETFCDLILLss

-----cttdg-t--cyVTASLDGESNCKTHya

-----vrdtialctaesidtlraaieceqpdpdykfvggrinix
xxx
-----eavars
lgp
-----e-----NLLLK--GATL-----k
nt---ekiy-----gVAVYTGME TKMAInyqgksq

-----krsaveksinaflivylfilltkaavct
-tlkyvwqstpynde---xwynq-----xxxxxxxlkvlkmf tdf lsfMVLFNF I
IPVSMYVTvEMQKFLGSF-FIswdkdf

-----ydeeineg
-----aLVN-TSDLNEELGQVDYVFDTKTG
-----TLTENSMEFi-----eccidghky

-----xxxxxxxdglsqtdxxl-tyfxxxxx
-----xxxx-----lf
lralclc---htve-----xxxx-
-----xxxxxxxxesxxx-x

-----yisspde--ialvkg---ak-r---
-----ygft--f--lgnrng-----ym-----
-----rvexx-----r
keie-----eyel lhtlnfdavrr-rmsv----i---vk-----

-----t-----q-----xg---d-----
-----i l--l-----f---
-c-----k-----
-----gad
s-----avfprvqxex-----

-----xelt-kvhvern--amd---gyrtLCVAFKei--apddyer inrq lie---
ak----ma lqdreekmekvfdd-ietnmn l IGATAVEDKLQDQAAET IEALHAag-LKV
WVLTGDKMETAKSTCYACRL-----fqtn tell ---

-----el----ttktxxxxxxx--edrxxxx-----

-----xxxxxxxxxxefxxxtxxxxxxxxxxx-----
-----xeygli idgst lsl-----
-----i l-----xxxxxxx
x-----nnyksiflq-----

icmkctavLCC--RMAPLQKAQ I VRMvk-----
---nl--kg-----xp-----ITLSIGDGANDVSMILESHVGIGI--
-----kgkegrq-----

-----AARNSDYSPkfKHLKKLL--LAHGHLYYVR I AHLV-----Q


```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXahaeqrXXXXXXXXXXXXX
-----XXXXXXXXXX-----
--vrriyvts--
-----XXXXXXXXXX-----
-----wfpsnkirttkyt-----pv---
-sfipknlwnqf-
-----k-nianaffl----fvtlI
-qci-----plfcP-----ehl--g-ls---fip
lsvi-I-----lttaikdgied-----yr-----rc---vl
dkkfntltw-----klv-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
xxxxxxxxxxn-akf-----x-----r-----
-----v
c-
---rkSLLVGDIVKVla-
---DEAIPADLLILst-
-----ensng-v---cyVETKNLDGETNLKDKya-
-----lcstkckseyrcsaasfwveceqpHADlyslNgvvkaX
XXXXXXXXXXXXX
-----kiheep
fsi-----
s-----NVLLC-GCTL-----r
ns---kwvi-----gLVLyTGSETRIQknrgltps
-----krSirtdlnwtiiInflIfamclfg
-vlrSiysaqnnSar---xfels-----xxxTApAhgiisiftSLILFQN
VPISLYITmDIVRSIQSY-FlfSDrem-
```


-----ydekldcp-----
-----cSPK-SWNISDDLQI EYIFSDKTG-----
-----TLTQNIMSFk-----kcsingiry-----
-----XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX-----

-----xxxxx--xxxx
xxxx-----itfiissk--fxdhlxxxx-----
-----xxxx-----xxxx--ef
fkalalc-----hsvv-----
-----t--dxx-----xxx--xx-----

-----ynaqspde--ealvkv--ar-d--
-----fgft--l--Intknr-----ry-----
-----tir--x-----r
genk-----nfrvldiipftstrk-rmsv--i--ir-----

-----x-e--d--g--i-----
-----ih--l-----i--
-c-----k-----
-----gad
t-----vifprls--s-----x-----

xxx--xx--ekt-kkhl asf--sse--gfrtLCIARRti--dkqdylewkvnfne--
an-----saihernekvskvsem-ieqe le lGGTAIEDKLQENVPETIALLA l ag-IKL
WVLTGDKVETAINIGYSCNL-----ldpnmtif-----

-----ri--dansxxxxxxxxxirnx-----

-----xxxxxxxxdxxxxfxxxxxxxxx-----
-----khaividgdalnf-----
-----v l-----
x-----eqvsflflm-----

lckqcktvLCC--RVSPSQKAAVVALVk-----
--ks--ln-----v-----VTLAIGDGANDVSMIQEADVGVGI--
-----kgvegqa-----

-----ASMSADYAIgqfSFLGRLL--LVHGRWDYKRMSQMI-----S
fff-yknvi-wtfilfwyqfynef-----dgniyfdytyvmIf
nllftsIpviiagcfddqvdas-----vsmknpslyqrgilglewngkr
f-wsymlldgiyqslvcfxvalfxkf-----xxxxxxxxxi-----

ec--iediglfissptifvinif-ilmqerlnlisli-----twmfsigvfwiftfi
ysevgpsyxxx-----ksasrtc-----
-----qtfgfw--cv--tvltialcllpr-----
-----fsyiclg-----klfy-----p-----rdi
-----xxxx-----

-----xxxxxxxxxtsssssfxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

>tanIV_IV01 XP_955173.1

m-----

-----xxxxxxxxxxxxfkpdee-----

-----irniklni-----

-----xxx-----

-----pcsnrvkttkyt-----py-----
-nfi fknlyeq|-

-----c-ipsnlyfv----fiavl
-qst-----pqvss-----tg--yxiv---llp
l i iv-l-----lf salkdgyed-----yq-----ry---ls
dnqlnnni vq-----i vnxxxxxxxxxxxxxxxxxxxxxxxxx
-----xx
xx
xxxxxxxxxxxn-kvl-----x-----n-----
-----k
y-----
---wk dLKVGEYVFLqn-----
---KDIAPADLVLLat-----

x---xx--vvt-lrnmkky--svg---glrtLVFAKRei--elkefnewlkeynr---
ik-----ltiesrdeklaecvsk-lecdlelQGVGTGIEDKLQTVSECIQLLMag-IRI
WMLTGDNLDT SINIGIATNL-----vnmlsdr i-----

-----ml-----dsntxxx-----

-----xxxxxxxxxxidxxxn-----

-----xxhrclldsisiey-----

-----ifxx
xxxxxxxxxxxxxxxxxtvtiefie-----

ilkrvhsvlCC--RMTPYLKGAVVTFvk-----
--nk--l-----xg-----ITLAVGDGANDCNMIQIAHVGI GI--
-----kgregsq-----

-----AFNASDFGIGeFRFLSPLI--LHHGRLCYRNLSKCI-----S
ymf-yknvi-liiplffayislf-----sgqkiyyslfvaiy
nvvftsipvgifgivdqdynre-----fsvkyphvyqlgqinhyfnvik
f-sgwilnaiiqsavif-fmmt-vgl-----xxxxxxxxxxxi-----

ad--aptlgimlssvfiivsck-lvletwyftkitll-----shlisiffiitvcs
fssspiysxxx-----gsafvlf-----
-----tsyrfw-----iv--ilgtlmlsmyrd-----
-----yfykvfk-----ysfc-----p-----qyy
-----xxxxxxxxxxxxxxxx-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).[illegible]

-----xxxxxxxxxxxxxxxxxxxxx|kdrmtfxxxxxxxxx-----

—yksircis—

-----xxxxxxpk|f|yng|vnskyn-----ff-----
-tfvp|v|ysqf-----

-----r-vfinlfyl---smcls
-qli-----pilrv-----esxxxlfp
lslv-v-----avcmikegied-----yk-----rh---vr
drehntqkfs-----vyqxxxxx-----

-----v
s-----
----aerLKLGGQLITLkq-----
----GQRVPADLLLLkt-----

-----sdpng-a---sfVRTDQLDGETDWKLRa-

-----vattqamsnlkdi lglysvatveeprddfnftgkicfxx
xx
xxkives
lnv-----
-----d-----NIVWM--NSIV-----
as---gtih-----gLTIIYGKDARAClnskraki-----

-----kyglfekeInrIfivliilimvcvImI
-spsgfmsm-----wyvt-----fIkyLLLFTI
VPLSLRISIEIAKYVYNR-Glvmdkki-----
-----pn-----
-----tMPR-TTMIPEELGRINYLLTDKTG-----
-----TLTQNVISLe-----klyitrgyy-----
-----xxxxxxxxxxxxx-----

-----xxxx---xxxx
xxxxxxxxxx---xxxxxxxxxxxxxxxxxxlenr-ly-----
-----ls
llslavc---hnvr-----
-----pvxxx-----xxxx-----

-----xxxxxxx-----
-----xx-----
-----x-----fqgsspde--ialvrf----an-q
-----cnvk--l--verddy-----km
-----vlm-----v
n---xxxx-nlrilfmipfssetk-rmgi---i--ve

-----x-e-----xg-h-
-----kh-f-----f
-l-----k-----
-----gae
v-----vvipml|xxgx

-----vwl-seecdnl--arm---glrtLVFAYRsi--sdseysnfvdqkyne--
an----lslydrvkkirkvtgt-lehgmlIVGLTGVRDKLQRNVGSTLESLKNad-IKI
WMLTGDKIDTAKCVAISSGM-----iqrnnsif-----

-----qi-----svdk-----

-----xxqixxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxktllidsfvini-----
-----si-----xxxxxxxxxxxxx
xxx-----kalkrIfik-----

s||lanniLFC--RCTPQMKADIVKLLk--
--se-nk-----IVCSIGDGDNDVPMISEANVGIGI--
--vgkeglq-----

-----ASLSSDYSLVeFSHIKRLL--LWHGRNSYKRSSTMS-----

fli-hrgvi-isvmqaifstiyyf-----mpiaffqgwlilvgf
tsyynmipifcl-vldeeisee-----dvmlfpelyvelkkgrelnikt
f-liwiwisifqgai lm-vgai-ilf-----e-----

-----iklivt-----

>dmeIV_IV01 NP_725290.1

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxydaddge-----

---rriinlng-----

-----xx-----

-----ptkygnnr ittakys-----fi-----
-sflpaf lfeqf-----
-----r-rysnccffl----liai l
-qqi-----pevsp-----tgr---y-tt----lvp
lmfi-l-----svsaik eiied-----ik-----rh---ra
dneinh rsie-----rld-----

-----s-gsw-----x-----t-----
-----v
r-----
---wseLTVGD I I KVgi-----
---NTFFPADL I LLss-----

-----sepqa-m---cf I ETANLDGETNLK I Rqa-

-----lpatae l letkd l qrl egr i ecel pnrh l yefngv l rex-

-----gkppaa
lgn-----
-----d-----QVLQR--GAIL-----r
nt---awvf-----gl VVYSGQETKLMknstsapl-----

-----krstvd klntq i l m l f m i l i s l c i i s g
-lcnl fwtrehsetd---wylg-----xxxfk tks l gyn l l t f I L Y N N L
I P I S L Q V T I E L V R F L Q A I -F l n y d i e m-----

-----yheesntp-----
-----aMAR-TSNLNEELGMVKYIFSDKTG-----
-----TLTQNVMEFk-----kcsiagyvy-----

---xxx-----rtpeesq--lxqnixx--x-----
-----xxxx-----xxxx-----ef
lellsvc-----htvi-----
-----pe--rxx-----xxx--xx-----

-----yhaaspde--ralveg---aq-k-----
-----fgyi--f--dtrtpk-----yv-----
-----ein--x-----l
gvrk-----ryevlnvleftssrk-rmsl----i--vr-----

-----x-p-----e-----n--k-----
-----ik--l-----f-----
-c-----k-----
-----gad
t-----vayerla--p-----x-----

xxx--xx--eqt--lrhleef--asd----glrtLCLAVAdi--rpdvyqewsqtfdk---
as-----valqnreskleetaanl-iennlrILGATAIEDRLQDGPETIASLLDag-IYI
WVLTGDKQETA INIGYSCRL-----ishsmdii-----

-----il-----nees-----ldaxxxx-----

-----xxxxxxxxxxxxssxx-----
-----xxnvalvidgttlky-----
-----al-----
x-----cdlrndfqd-----

lci lcrvv lCC--RVSPMQKAEVVEMVt-----
--qsx-----xa-----VTLAIGDGANDVAMIQKANVGIGI--
-----sgveg lq-----

-----AACASDYSIAqfRYLQRLL--LVHGAWNYARISKLI-----L
ysf-yknvc-lyvielw favysgw-----sgqilferwtigly
nvlftamppfangl fekfctae-----tmirypmlyktsqnaklfnvk
f-wiwifnal l hsvflf-wlplxayt-----xxxxxxxxxt-----

sd--yl lmgnlvytyv ivtvcl k-aglitnswtwlthl-----aiwgsivlwfgflli
yshvwpmfxxxxxx-----gmdiqll-----
-----stpvfy-----fc--lmlvpittllid-----
-----vicklvh-----ntvf-----k-----tlt
-----xx
xx-----
-----xxxxxxxxat l hiftexxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxx-----

>dmeIV_IV02 NP_723806.1

m-----

```
--xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxfrprelr-----
```

---artvnlgr-----

-----xxtkfpneirngkyn-----fi-----

-tf|p|v|feqf-----

-----r-fflnlyfl----lma1s

-qfi-----pdiri-----gyp--y-ty---wgp

lgfv-l-----mvticreavdd-----lr-----rh---qr

dhevnsqkyk-----r l s-----

-----xxxxsxyem-----

-----V

p_____

-----sskLKVGdVlIVek-----

-----NERVPADLILLrt-----

-----sdrsg-s---vfVRTDQLDGETDWKPRIa-

-----vpytqklrdselhsidasfyvekpqndihsfiatfcmxx

-----gsedtg
lsv-----
-----e-----NTLWA-NTVV-----
aa---gtat-----gIVIYTGCETRSVmnnsqprs-----

-----kvglldmeingltkvlfcavlglsivmm
-mlkgfggp-----wry-----mfrfVLLFSYI
IPISLRVNI DMGKAFYSW-QMqndsni-----
-----qg-----
-----tVVR-STTIPeelGRISYVLTDKTG-----
-----TLTQNEMVfk-----kihlgivsh-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxxegwr-ew-----
-----ea
vralalc---hnvt-----
-----pvxxx-----

-----xxx-----
--x-----yqaaspde--ialvkw---te-q---
-----vglt--l--iardln-----tm-----
-----tlq-----v
ktpsxxxxxxhyqilqlfpftsesk-rmgi---i---vr-----

-----x-s-----k-----xg---q-----
-----it--f-----y-----
-l-----k-----
-----gad
v-----vmssiv--xyx-----

[illegible]

m

```
-----XXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-XXXXXXXXXXXXX
X-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXagrghsr-----xx-----
-----XXXXXXXXXXXXXXXXXXXXX
-----
```

-----xxxxxxxxx-----
 -----ghsrqasr-----

---ghsrqasr-----

XXXXXXXXXXXX

XXXXXXXXXXXX

-----XXXXXXXXXXXX-----

```
-----XXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXngqfvgnkirttkyt-----||-----
```

```

xxxxxxxxxxxxxxxxxxxxxxxxnqgvgnkirttkyt-----||-----
-sfipknlleqf-----

```

-----sfipknlleqf-----

[illegible]

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXyeaespe--la|vna---a-----
-----ysydxl--lnrspn-----qix-----
-----xxxxxxxxx-----
-----eyei|kv|pfdsrrk-cmsi---v-----

-----vxxxxx-----xxxxy-----
-t-----k-----gad
s-----simpvlvxss-----

xxxxxxxxxeqt-qqlldry--are---glriLVMAKRtl--nsadytdwwarhqe---
-----xemslenrerrlrdsfaxlesnltilGATGIEDRLQDGPETIASLLSag-ISV
WVLTDKPKETAINIAYSACL-----ftqqmeli-----

-----rl----tars-----rdaxxx-----

-----xxxxxxxxxdkxxxtxxxxxxxxx-----
-----xxqralvvdgktltf-----
-----il-----
xxx-----sklipflr-----

lskr casvLCC-RSTPLQKAYLVKVvk-----
--ee--|--xl-----RTLAIGDGANDVSMIQMADVGVGI-----
-----sgqegmq-----

-----AVMAADFTLPfrFYLERLL--LAHGYWCYDRLSRMl-----

yff-yknaa-fvfliifwyqlcgcg-----sgqvmmdqmylmly
nliftslpplaigvydkrvaed-----lllknpylykngrlgvayrphd
f-wlllldalyqslvif-fval-cay-----xxxxxx-----

>dmeIV_IV04 NP_731669.1

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXpnksddq-----xx-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

-----xxxxxxx-----
---syysene-----

-----xxxxxxxxx-----

-----xqfkyhnnyiktskys-----lf-----
-tflpfnlleqf-----
-----qrlanfyfl----cllv
-qli-----paiss-----ltp--v-tt--aip
ligv-l-----tltavkdaydd-----i-----
--vnnrsk-----tlr-----

-----n-gkl-----x-----e-----
-----a
k-----
---wseVQVGDVIRLdn-----
---NQFVAADTLLLst-----

-----sepng-l---cfIETAELDGETNLKAKqc-----
-----xtetielgdrhdslwnfngeiicerpnnlnkf dgtliw-----
-----rgqrfa
ldn-----
-----e-----KILLR-GCVL-----r
nt---qwcy-----gVVVFAGVDTKLMqns gktqf-----

-----kstgvdrllnfiiigivflvsicalfa
-igc aiwegligqh f-----xlylp-----xxxxxxxxxxxgatvigllvffsyAIVLNTV
VPISLYVSvEVIRFVQSFLInwdeem-----

-----yypttnty-----
-----aKAR-TTTLNEELGQIQYIFSDKTG-----
-----TLTQNIMTFn-----kcsingrsy-----
-----xxxxxxxxxxxxxxxxxxxx
xx
xx
xx
xx--xxxx
xxxxx-----frwydrt--lxdavxx--x-----
-----x-----xxxx-----vf
frllalc-----htvm-----
-----ae--t-x-----xxx--xx-----

-----yqaqspde--aalvsa-----ar-n-----
-----fgfv--f--rtrtpn-----si-----
-----tie--x-----m
gqte-----eyellnildfnvrk-rmsv----i---lr-----

-----x-g-----d-----s--m-----
-----v--l-----y-----
-c-----k-----
-----gad
n-----viydr|h-g-----x-----

xxx--xx--art-qdhlnkf--age----glrtLALAERr|--teqyyndwrsrqe---
aa-----lsmdsreqklnaiyee-iesemq|VGVTAlEDKLQDGVPKSIANLQNag-|K|
WVLTGDKQETA|NIGYSCQL-----|tde|adv-----

-----fi-----vdgn--xx-----eevxxxx-----
-----xxxx-----xxxxxxxxxxxxxxxxxxxxxxxx
xxxx-----xxxxxxxxxtsxxxqxxxxxxxxxxxxxxxxxxxx
xxgfa|vvnghs|vh-----
-----c|-----
x-----pe|enkfld-----

iasqckav ICC--RVTPLQKALVVEL Ik-----
--ra--kn-----a-----VTLAIGDGANDVSM I KAAH IGVGI--
-----sgqeg lq-----

-----AVLSSDYS I Aqf RYLERLL--LVHGRWSYYRMCKFL-----R
yff-yknfa-ftlchcwys lfcgf-----saqtvfdpmf isvy
nlfytslpvlalgvfeqdvsdk-----nslefprlytpglkselfnire
f-iysvlhgafts l v l f-lipyxvyk-----xxxxxxxxxv-----

sd--hmtlgavvati l i v d n t a q-i s l y t s y w t v v n h v-----tiwgs l v w y f v l d y f
ynyviggpxx-----gs l t q a m-----
-----kd l t f w--vt--m l i t v m a l v a p v-----
-----l a y k f y l-----l d v h-----p-----s l s
-----xxxxxxxxxxx-----

-----xxxxxxxxxassrrgrxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----xx
xx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-
>dmeIV_IV05 NP_573124.1

m-----

[illegible]

ssadrxcfvNTANLDGETNLKTLcv
ptnyllagdhelqgkdcivcepssadlytfnglrlelxx
xxxxxxxx
agdalp
lti
dNLLLRGVRVk
stervvgCAIYTG MHTKLQlnsrytgn
ksassekyinrfmvalivgmivvvvly
lierhkeakivptmxxxxxtfnxxxqifedflsfLLLLFNMY
VPISAYMNI EYRIFGMHFMhndlhlydeetdqp
cRVN-ASNLNEELGQVNI LFSDKTG
TLTKNLMKFvncyvpgtny
xxxxxxxxvsegtdexxexeklxxxxx
vlf
fealavchtevexxxxx
xxxxxxxxxxxxxeqxxmxxxxxxxx
yqasspdekallegcas
lglvyeqgendvl
sicxxxs
aekvqfkr l h v l e f s s e r q r m s v i v r
dqt
iwly
sk
gae
s
aifprckxxp

-----xxeqt-daqitky--aqn----glrtMAVGRRml--tddelfhfeelyrk---
an-----tqlsnrne liascyet-vene l d l LGATALEDALQEHVGETLEALQAag-LKl
WVLTGDKVETAYNIGLACRH-----iprgskqh-----

-----fi-----inttxxx-----
-----xxxxxxxxdexx-----
-----vlivdgttita-----
-----||-----
-----ehtprqfad-----

lalrcravLCC--RLSPLQKSEIVTLlk-----
--rr--k-----xy-----ITAAIGDGANDVSMIQEAHIGIGI--
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-----AARCADFSIArfEMLRRLF--LVHGHYNSQRLAFLV-----L
fyc-yknii-itgcmaryqvydly-----satnvynsiylwlf
divyisfsftvlaicdkdysee-----tllshpelykplahnraqsmgv
f-slwilngfvqcfiif-fftyxmln-----xxxxxxxxxt-----

as--fqtfgtmlitiivivgnlk-lllvahymtyrnfa-----milasiaafmlttyl
ynlytsgexx-----dvyngfl-----
-----sslpw----lf--tiicsvacllpd-----
-----fvikvvn-----
-----xxxxxxxxxxxxx-----

>dmeIV_IV06 NP_573125.1

m—

-----xxxxxxxxxxxxxdr | gahr-----xx-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXX-----

---wlqiqigg-----

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-----qnr ikstkyt-----li-----

—tf|pqn|leqf—

-----r-rianfyfl-----vmtii
-sll-----id-sp-----vsp-m-ts---llp
lvfv-i-----avtaakqgyed-----il-----ry--rt
dnvvnnsspvt-----vir-----

-----d-gke-----x-----i-----i
k-----
---sqdVIPGELIVVer-----
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-----tdphg-k---cfITTANLDGESNLKTLmv-----

-----prdlptvdlpemhkligiecspttdlysfngkielxx
x-----

-----egrvlp
lst-----

-----e-----NVLLR-GSRV-----k
nt---ecvi-----gCAVYTGMISKLQlnsrltrn-----

-----knassetyinrfliivilvaliaivtllly
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IPISLYVTiELQRVIGSW-FMewdlel-----

-----yenetdq
-----cVVN-TSNLNEELGQINILFSDKTG-----
-----TLTKNEMNFq-----qcsingnkf-----

-----xxxxxxedeetkaxxdxnkfxxxxx
-----vf
fqalsic-----htvq-----xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxeexxxaxxx

xx
xx
xxxyqasspde--ka l vea----ca-n----
-----l gmv--y--tgddde-----t l-----
-----rvrxxxxxxxxxxxxxk
pree-----tfqr lhv leftsdrk-rmsv----i---vr-----

-----d-----t-----xg---k-----
-----kw--i-----y---
-t-----k-----
-----gae
s-----yvfp l ca-----

xxx--xxxxtktdahisdf--ar l----glrtLA lARR l i--seeeyqdf lvelaq--
an-----ss lenrkqlseecyak-iesnld lLGATAVEDALQDDVADTLVSLQAag- lK l
WVLTGDKVETALN lALSCGH-----ippdakky-----

-----fi-----meckxxxx-----

-----xxxxxxxxxeixxi-----
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-----al-----
-----aeassefrd-----

vavkctavLCC--RLSPLQKSEVVSL l k-----
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-----mgregrq-----

-----AARCADFAFAk fCMLKRLL--LVHGHYHSVRLSLLV-----L

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>pfaIV_IV02 XP_001350596.1

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---dvkining-----

-----x-----

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lliv-l-----tanaikdafed-----wn-----rh---kt
dkienrmcyxxxxxxxxxyqxxxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxx-----
-----xxxxxxxxxxxxxxxx-----
xxxxxxxxxxe-gtv-----x-----
-----k-----
r-----
---wkdIKAGDIILCrr-----
---SEFFCADILLct-----

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xx
xxxxxxxxxxxxxxxxxxxxxxxx-----nyirip
fde-----
-----k-----QFVLR--GCKL-----k
nt---dwim-----gIVIVVGRETQImnssksik-----

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XXXgnnkqysXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXaVPR-TSSL IEELGQIEYIFSDKTG-----
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-----XXXXXXXXXXXXXXXXXXXX-

-----XXXXXXXXXXXXXXXXXvniidnd--ixnhlxxxxx-----
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flhlain---havi-----
-----ce---kxx-----xxx---xx-----

-----ysssspde-ealvna---ak-h-----
-----fdit-f---lyrreg-----ky-----
-----gis-x-----f
gkiy-----eidtlatieftskrk-mssv---i---crXXXXXXXXXXXXXXXXXXXX
XX
XXXXXXXXXXXXXXXXXXXXxs-----k-----xs---k-----
-----im-l-----f-----
-c-----k-----
-----gag
s-----iilkklaxxt-----

x---xx---eit-iehmety---ade---glrtLCIAQRel---seesfaewyhlyke---
as-----lsikdreeklesvaey-iendlilQGITGIEDKLQEGVSSTIEDLRMag-IHI
WMLTGDKIETAMNIGIAANL-----idnyseqf-----

-----iy-----teeyxxxxxxxxxxiddxxxx-----

-----XXXXXXXXXXXXddxxnXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX-----XXXXXXXXXXXXnyvlvvdgsvidl-----
-----||-----
x-----ekmerkffyy-----

l adkcssv l CG--RVSPYQKGA l VSSAn-----
--r l-- l n-----k-----ITLA l GDGANDRN l MINTAN l G l G l--
-----r gqegvq-----

-----AFNSSDYG l SqfRFLKNLL--LVHGRLSYRR l SKLV-----V
ymf-yknmv-l ifpl f ifgs is ly-----sgqki yef l l h l f
nvl ftaipvvi hav l dqdis l n-----tamekpnlykl g ihhyfni r t
f-i swvmns l fhgsvvfxi plyx l sy-----xxxxxxxxxp-----

yd--iwtvgcatyfl t v l i vnfk- i l fetyy l ni l pis-----gial s i f s f v l l vta
fsfmcvg sxxxx-----gtivyl v-----
-----qslrfw-----lv--vilglftallrd-----
-----yvfkvkyk-----rnfn-----p-----eiy
-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxir i eksksxxxxxxxxxxxxxxxxxxxx
xxxxxxx-----

>pfa l V_ l V03 XP_001350631. 1

m-----

[illegible]

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxnettnxtxxxtyVKTDKIDGETDWKIKyp-

-----inifqnIkrIkdfiftidilfileqpknidykiegsfvixx
xx
xxdqvqne
kkkxx
xxNFILF--NSVI-----
ts----sdvi-----cLVIYTGSDTRVNmstqiski-----

-----krgmideklnliltlflfiiltlfsiymc
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IPISLSVNINIAKIYYTL-Llqrdkev-----
-----es-----
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xx-----

-----xxxxx--xxxx
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flsflic----nnir-----
-----xxxxssxxxkxx-----xxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxx
xx-----
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-----cgfi--l--kkktas-----ki-----
-----eikx-----k
niml-----eydillhipfssetk-rmsi----f--vr-----

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-----iy--f-----f-----
-i-----k-----
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n-----vlikkch-----

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-----if-----rhenxxxxxxxxxfnsxxxx-----

-----xxsyvlffdni i iqn-----

-----ci-----

-----kypnafvd-----

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-----lgkegkq-----

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ttyyttapflsl-lldikikn-----liylypeiynkhhkrkldlks

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-----fkla-----

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-----r-vfinlfyl---smclt
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lslv-v-----avcmIkegied-----yk-----rh---vr
drehntqkfs-----vyqxxxxxx-----

-----v
s-----
----aerLKLGGQLITLkq-----
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-----sdpng-a---sfVRTDQLDGETDWKLRa-

-----vattqamstvkei slslysvatveepkddfyntgkicfxx
xx--xxxxxx-xxxxxxxxxxxx
xxxxxx-----xxxxxxx-----xxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxkrives
lnv-----
-----d-----NIVWM--NSIV-----
as---gtih-----gLTIIYGKDARAClnskrakm-----

-----kyglfekeInrlfivliilimlmcvmmI
-cpngfmsm-----wyvt-----flkyLLLSTV
VPLSLRISIEIAKYVYNR-AIvldnki-----
-----pq-----
-----tMPR-TTMIPEELGRINYLLTDKTG-----
-----TLTQNVISLe-----klyitrgyy-----
-----xxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxlenr-ly-----
-----ls
llslavc-----hnvr-----
-----pixxx-----xxxx-----

XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX-----XXXXX-----XXXXXXXXXXXXXXXXXXXXX-----
--x-----fqqsspd---ialvkf---an-l-----
-----cnvk---l---verddy-----km-----
-----ilm-----v
n----xxxx-nlrilfmipfssetk-rmgi---i---ve

-----x-e-----xg---r-----
-----kh-f-----f-----
-l-----k-----
-----gae
v-----vvipmlxxgx-----

-----vwl-seecdnl---arm---glrtLVFAYRai---sdseydnfvqkyne---
an----lslydrvkkirkvtgt-lehgmlIVGLTGVRDKLQRNVGSTLESLKNag-IKI
WMLTGDKIDTAKCVAISCGM-----iqknnsif-----

-----qi-----svdk-----

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-----av-----xxxxxxxxxxxxx
xxx-----ktlrrlfvk-----

sllannvLFC-RCTPQMKADIVKLLk-----
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-----vgkeglq-----

-----ASLSSDYSLVeFSHIKRLL-LWHGRNSYKRSSTMS-----

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f-liwiwisifqgai lm-igai-ilf-----e-----

-----iklivt-----

>tpaIV_IV02 XP_763506.1

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---lrviklni-----

-----xxxx-----

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-qst-----pqvss-----tag---yxvv---llp
liiv-l-----lfsalkdgyed-----yq-----ry---ls
dnqlnnn ivq-----ivnxxxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxx-----
-----xxxxxxxxxxxxx-----xxxxxxxxx---xxx
xxxxxxxxxxxn-kv l-----x-----n-----
-----k
y-----
---wkdLKVGEYVFLqn-----
---KDIAPADLVLLat-----

-----seeng-f---afVDASSLDGETNlKKKesx
xx
xxxxxxxxxxxxxxxxxxxxxxxxx elgsdfehv itevqrllghfkcegnknli sfdghlkyxx
xx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----eirdaq
vs l-----
-----n-----NLLLR--GCKLxxx-----
-----qvw i-----gFVYTGHDTKlYkniskapy-----

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-----xxx-----xxx-----df
ffhlaln-----nwai-----
-----pd--sxx-----xxx-----

-----ymcspde--lcfvna-----aa-f-----
-----cgfr--l--lqrnsn-----fa-----
-----tvs--x-----f
nkiy-----kvkii aqadfdyrrk-cstt----i--vaxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----xxxxxxxxxxxx-----xx-----
-----xxxxxm-----s-----xy-----r-----
-----i i--l-----y-----
-c-----k-----
-----ggd
n-----vmvsklkxxs-----

x---xx--svt--lrnmkny--svg---glrtLVFAKReI-----
-----kgrdeklaecvgr-lecglelQGVGTGIEDKLQDGVSECI EKLLMag-IRI
WMLTGDNLDT SINIGIATNL-----vnmIsdr i-----

-----ml-----dsnt-----

-----xxxxxxxxxxxxxxxxxidxnxx-----
-----xxhrci iidsitiei-----
-----lf-----xxxxxxxxxx
xxx-----telsvlfle-----

lvrrvhsv|CC--RMTPYLKGAVVSFV|k-----
--sr--|g-----g-----|TLAVGDGANDCNMIQTAHVGVG|I--
-----kgregsq-----

-----AFNASDFG|GqfRFLSPL|LHHGRCCYRNTSKC|-----S
ymf-yknvi-liiplffayislf-----sgqkiyyslfvaiy
nvvftsvpvgifgivdqdynks-----lsakyphvyqlgqrnyyyynvvk
f-sgwi|naviqsaiifxmnt|xlgd-----xxxxxxxxxi-----

ad--apt|giml|savfiivsck-lvletwyftkitl|-----shlisifffivtvcs
fsaspvysxxxxxxxxxxxxxxxxxcvvyelp-----
-----v|draaxxxav--nvqg||lqgvqv-----
-----|v|pall-----p-----

-----xxxxxxxxxnpdtkpl|xxxxxxxxxxxxx-----

>dreIV_IV01 XP_683800.1

m-----

-----xxxxxxxrkkekev-----

---erkirand---

-----xxxxx-----

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-----q-rianayfl----fllil

---qvi-----paiss-----lsw---f-tt---vvp

l|v|v-|-----svtaakdaidd-----in-----rh---rs

drqvnnrkvn-----vli-----

-----s-gkl-----x-----s-----e

k-----

---wmnVQVGDI|KLen---

---NQFVTADLLLLss---

-----sepInI-----vyIETAELDGETNLKVKqs-----
 -----xtvtgdmghnlealaafngevcceppnnrldrftgtlft-----
 -----dtqkys-----
 ldn-----
 -----e-----RVLLR-----GCTL-----r-----
 nt-----dwc-----gLVLFAGPETKLMqncgkstf-----
 -----krtsidrlmnvlvlififallalmciila-----
 -vghgiwenytgskf-----xvfIp-----xxxnaafsafItfwsyIIILNTV
 VPISLYVSmEVIRLGNSY-YInwdrnm-----
 -----yhtrtdtp-----
 -----aEAR-TTTLNEELGQIKYIFSDKTG-----
 -----TLTQNIMTFn-----kcsingksy-----
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 xxxxx-----flfydhs-----lxeavxx-----x-----
 -----x-----xxxx-----af-----
 frllalc-----htcm-----
 -----ae-----exx-----xxx-----xx-----
 -----yqaqspde-----galvta-----ar-n-----
 -----fgfv-----f-----rsrspe-----ti-----
 -----tie-----x-----m-----
 giqr-----tyellaildfnnvrk-rmsv-----i-----vr-----
 -----x-p-----e-----g-----k-----
 -----ls-----l-----y-----
 -c-----k-----
 -----gad-----
 t-----iierlh-----p-----x-----

XX

>dreIV_IV02 XP_687715.2

m

xxxxxxxxlepalke

erhvr and

xxxxx

rfsyadnr iktakyn

vf

-tflpinlfeqf

-----q-rfanayfl---vllil
-qli-----peiss-----lsw---f-tt---ivp
lvlv-l-----aitavkdatdd-----yf-----rh---ks
dqqvnrqsq-----vli-----

-----k-gkl-----x-----n-----
-----e
k-----
----wmnVRVGDVlKLen-----
----NQFVAADLLLLss-----

-----sepyg-l---cylETAELDGETNLKVRqa-

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-----kdnkyp
ldn-----
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nt---ewcf-----gLVIFAGLQTKLMqncgrtkf-----

-----krtsidklmntlvlwifgflcmgiila
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-----aEAR-TTTLNEELGQVEFIFSDKTG-----
-----TLTQNIMVFn-----kcsingkty-----
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-----xxxxx-xxxx
xxxxx-----frfhdss--lxeaixx-x-----
-----x-----xxxx---ef
frllalc---htvm-----
-----pe---exx-----xxx---xx-----

-----yqaqspde--galvta---ar-n---
-----fgfv--f--rsrtpe-----ti-----
-----tly-x-----m
gqav-----tyql la i ldfnnvrk-rmsv---i---vr-----

-----x-p-----k-----g---q-----
-----lk--l-----y---
-s-----k-----
-----gad
t-----i l fdr l d--p-----x-----

xxx--xx--ftt-seh l nef--age---glrtLALAYKdl--dedvfdewtkk l l f---
as-----tal dnreek l gal yee-ieqgmm l LGATA l EDKLQEGVPET l ACLTLan- l K l
WVLTGDKLETAMN l GYSCNM-----l rddmnev-----

-----fi-----i sgh--xx-----levxxxx-----
-----xxxx-----xxxx-----xx
xx-----xxxxxxxxxekxxxxyxxxxxxxxxxx-----
-----xxeyal i inghslah-----
-----al-----
x-----ae l eq i l vd-----

vac l cksv l CC--RVTP LQKALVVEL l k-----
---rh--kr-----a-----VTLA l GDGANDVSM l KTAH l GVG l ---
-----sgqegmq-----

-----AVLASDYSFAq f RYLQRLL--LVHGRWSYHRMCNFL-----C

yff-yknfa-ftlvhwgflcgf-----saqtvydqwf itlf
nivytslpvlamglfdqdvneq-----yslrypnlyrpgqlnqlfnkrk
f-ftctlgvytsfilf-fipyxafm-----xxxxxxxxxi-----

sd--qqafavtiatslvivsvq-igldtnywtavnhf-----fiwgsldvyfailfa
mnsngiftxxxxxxxxx-----gsarnsl-----

-----nqkiwv-----lv--i||ntvvcimpm-----

-----lavrfik-----tdly-----p-----tht

-----XXXXXXXXX-----

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-----xxxxxxxxx|rrvrrtsxxxxxxxxxxxxxxxxxxxx
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-----XX-----

\\droIV_IV03_YP_601382_2

7dfe1v_iv05 xp_091582.2

m-----

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---srtvyigh-----

-----xxxxxxxx-----

-----pqr fpdnr ivsskyt-----fw-----
-nfipknlfeqf-----
-----r-r ianfyfl---i i flv
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lffv-i-----tvtaikqgyed-----wi-----rh---ka
dnsvnqcpvh-----ivq-----

-----h-gkv-----x-----r-----
-----k
q-----
---sqkLRVGDI VQVke-----
---NETFPCDL ILLst-----

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xxx-----
-----epiarp
lgs-----
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nt---eyih-----aVAIYTGME TKMAl nyqsksq-----

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IPVSMYVTvEMQKFLGSY-Fllwddm-----

-----fdeevger-----
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-----xxxx-----lf
fralcic-----htvq-----xxxx-----
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-----yisspde-valveg-----mk-r-----
-----lgft-y-lrlkds-----hm-----
-----eilxx-----e
deme-----rfelldvlnfdsvrr-rmsv-----i-----vr-----

-----s-----n-----xg-----e-----
-----yy-l-----f-----
-c-----k-----
-----gad
s-----svfprvvxxk-----

-----xeqv-rarvehn-ave-----glrtLCVAYKrl-sqeeyeetcrlits-----
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-----vl-----xxxxxxx
xxx-----gnykeifle-----

icrncsavLCC--RMAPLQKAQIVKLlk-----
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f-iywtflgvfdavvff-fgafxlfd-----xxxxxxxxxm-----

fg--nwtfgtlvftvlvftvtlk-laldthywtwinhf-----viwgsllfyvifsl
wggiiwpf--xxxxxxx-----yvfmqml-----
-----ssgpaw--ls--iillivslld-----
-----vkkvlc-----ralw-----p-----ttt
-----xxxxxxxxx-----

-----xxxxxxxxxsqtsssvsx-----

>dreIV_IV04 XP_691903.2

m-----

[illegible]

sepInl—iyIETAELDGETNLKVKqa—
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 —————ggetfa
 ldn—
 —————e————RILLR—GCTL—————r
 nt—ewcf—————gLVLFGGPDTKLMqns gksif—
 —————krtsidhlmnv lvlfifgflafmctils
 —ignaiweyqegnsf—xvf lp—————xxxxxnaslsaf ltfwsyVIlNTV
 VPI SLYVSvEILRLGNSY—FIdwdrkm—
 —————y hvksdtp—
 —————aQAR—TTTLNEELGQIKYIFSDKTG—
 —————TLTQNIMTFn—————rcsingksy—
 —————xxxxx—xxxxxxxxxxxxx—
 —————xxxxx—xxxx
 xxxxx——————fffhdhk—lxeavxx—x—
 —————x—————xxxx—af
 frllalc—htvm—
 —————pe—exx—————xxx—xx—
 —————yqaqspde—galvta—ar-n—
 —————fgfv—f—rartpe—————ti—
 —————svv—x—————m
 giet—tyellavldfnvrk-rmsv—i—vr—
 —————x-p—————e—————g—k—
 —————lm—l—————y—
 -c—k—
 —————gad
 t—iiyerlh—p—————x—

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

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>dreIV_IV05 XP_692383.2
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m-----

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—sf | pmn | feqf—

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-nfi-----pvvna-----fqp---e-va---lip
ici-i-l-----altavkdgwed-----fr-----ry---qt
dqqlnnmpcf-----ifr-----

-----xxl-mcf-----x-----e-----
-----r
r-----
----wkdVRVGDFVKVls-----
----NEIIPADILLht-----

-----sdpng-v---chMETANLDGETNLKQRkv-

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----xxxx-----
-----dkrrsg
fgi-----
-----d-----SLLLR--GCTV-----r
nt---ddaa-----gIVVYAGHETKSMInnngpry-----

-----krskierkmntdvlfcvlllffmcliga
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IPVSLYVSIELVKMGQIF-Fltqdael-----
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-----xx-----xxx-----df
flalaic---ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
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xxxxxx-----xxxxxx
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 -----tvkxxx-----e
 tll-----kfevlldvltfdstrr-rmsi---i---vr-----

 -----x-p-----h-----xn---e-----
 -----i-i-m-----y-----
 -t-----k-----
 -----gad
 s-----avmeklgxxfxxx---xxxx-----

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 WVLTDGKPEAVNIAYSCKL-----ldhedlvf-----

 -----tf-----ttnk--xx-----vckxxxx-----
 -----x
 xxxx-----xxxxxxxxxxdpxxxgxxxxxxxxxxx-----
 -----xxsiglvidgptlnm-----
 -----al-----
 x-----edlveqfve-----

 lckhcravLCC--RVTPLQKSSVVKVl--
 ---qk---lr-----v-----MTLAVGDGANDVNMlQAADVGlgv-----
 -----sgqegmq-----

 -----AVMASDEFAITrfKHLQRLl--LVGHWCYSRLANMV-----

```
yff-yknva-yvnllfwyqffcgf-----sgtamidywlmiiff
nlfftsappimfgimdkevsds-----tllslpelryrrgqhsegryrst
f-wiaildafyqslvcf-fipy-wty-----xxxxx-----
```

```
-g--ifsfgtpmntvslftiilh-laieikswtvvhvw-----imvgsvlvvyfilitla
ysaicisc-xxxxxxx-----wimhkqm-----
```

-----adpmfy-----lv--cv|ttvval|pr-----

-----ytlrvlk-----gtla-----p-----slh

-----XXXXXXXXXXXXXXXXXXXX-----

-----xxxxxxxxx|sas|sstxxxxx-----

```
>dreIV_IV06 XP_693773.2
```

m-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX

xxadpvdat

---artvllnr-----

-----xx-----

-----ttkycdnhvstakyg-----il-----
-tflprflyeqi-----
-----r-raanaaffl----fialm
-qqi-----pdvsp-----tgr--y-tt----lvp
lifi-l-----tvagikeiied-----yk-----rh--ka
dntvnkkktt-----vlr-----

-----n-gaw-----x-----t-----
-----i-----
i-----
---wkqVAVGDIVKVtn-----
---GQHLPADMVIVss-----

-----sepqa-m---cyTETSNLDGETNLKIRqg-----

-----lsltasfsledliaisgrlecegnrhlydfgtglrlx-----

-----nhnpap-----
lgp-----
-----d-----QVLLR-GAQL-----r-----
nt---qwvv-----gIVVYTGHD SKLMqnstkapi-----

-----krsnvervtnmqilvlfgillvmalvss-----
-igaaawnkqhtdea---xwyls-----xxxdislnfaynlitfiILYNL
IPISLLVTIEVVKFTQAL-Flnwdvem-----

-----yyaetdtp-----
-----aMAR-TSNLNEELGQVKYLFSDKTG-----
-----TLTCNVMHFk-----kctiagity-----
-----xxxxxxxx-----

-----xxxxx-----xxxx
xxxxxx-----tefddpa--lxqnixx--x-----
-----xxxx-----xxxx-----ef
ltmmavc-----htvv-----
-----pexxxnx-----xx-----

-----yqasspde--galvkg-----ak-s-----
-----lgfv--f--tartph-----sv-----
-----ie--x-----r
gkeq-----tyelInvlefssnrk-rmsv----i--vr-----

-----x-p-----t-----g--n-----
-----lr--l-----y-----
-c-----k-----
-----gad
n-----viferln-----x-----

xxx--xx--elt-vahleqf--ate----glrtLCFAYVdl--eegaylewIkeynr----
is----tvIkdraqkleecyel-ieknlII LGATAIEDRLQAGVPETIATLMRad-IKI
WVLTGDKQETA INIGYSCRL-----vshgmsli-----

-----iv-----neds-----ldaxxxx-----

-----xxxxxxxxxs|xx-----
-----xxelalii dgqtlky-----
-----al-----
x-----fevrqafld-----

l a l s c k a v l C C — R V S P L Q K S E l V D M V k —
 — k h — v — — — — — x a — — — — — l T L A l G D G A N D V G M l Q T A H V G V G l —
 — — — — — s g n e g m q — — — — —

```
>dreIV_IV07 XP_694281.2
```

-----xxsttengi-----

---kwevrang-----

-----xxxxxxxxx-----

-----xxxxxwgryadnvrsykyt-----pl-----

-tffpInlyeqf-----

-----q-raanlffl----livi l

-qcv-----pviat-----ipw---y-tt---mlp

l liv-l-----fvr gckdlatd-----vg-----rr---rs

daqinrrpcd-----ilt-----

-----p-egf-----x-----t-----v

k-----

---wk dVCVGD ILRVhk-----

---DQVIPADLLLLcs-----

tephyslcyVETADIDGETNLKFRqa
xxxxhtelnngdsteqnlaafdaivrceepngnlhsfrgefhw
kgerhl
lgt
dHLLLRGTVLr
ntdyaygLTIIYTGSDSKILqncgrlkl
kkthveillnktvlvillfmittallla
igagifeyrispnydvvsxxxxxxspayqgfltfwgyllLLSPS
MPMSLYITfEVIHMHCLLlgwdvem
ywedtncp
aHARTTTLNEELGQVGHLLSDKTG
TLTQNRLLFrqcfiaghiy
xxxxxxxxxxxx
xxxxxlkfsdqrldxklxxxf
xxxxxxef
ftalalchtvm
sexxxx
yqaaspdeea|vcaar-e
lgwvf|srtrdtl
tisxm
gltrnyqlalldftskrr-rmsv|vr
xp-g-q
lkly
sk
gad
jvilerlqx

xxx--xx--est-dralelf--aqs---clrtLCVAVRpv--pealwtewsralnl---
-----xgtatgnqetlleeiydxmekdlmILGVTAIEDRLQEGVPETIASLRRag-VKV
WVLTGDKTETAVNVGYACKL-----mdpdtli-----

-----qg-----eels--xx-----qscxxxx-----

-----xxrteltk-----

x-----sewgakfva-----

lsgqcqsvLCC--RVTPAQKAEVVEMVr-----
--kh--sa-----s-----ITMAIGDGANDVNMIKTAHIGVGL--
-----cgvegsq-----

-----AVLNADFALaQfSFLRKLL--LVHGHWSYYRISILL-----R
yfl-yktta-falvhtwysfyngf-----saqpmyeswyislf
titytslpiqctgifeqdisar-----sclcwpeiysigqkkqlfnpsv
l-astllysfyssiiff-fvpm-gil-----xxxxx-----

-d--fqtlaitietsvlfattle-vilctkywtknva-----avifslaafflstla
lhstrlft-xxxxxxxxx-----asq-nay-----
-----stpevw---lt--ifvttcvavlp-----
-----ittrala-----ne-----p-----vel
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxxxxxxxxxxxxxxsknespxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxx-----

-----h-rfanvyfv---fiall
-nfv-----pvvna-----fqp---e-la---lap
vvfi-l-----svtaikdlwed-----yr-----rh---rs
dkeinhmcdl-----vyc-----

-----xxe-kry-----x-----e-----
-----k
y-----
----wkeLRVGDFIRLrc-----
----NEILPADVLLLst-----

-----sdpdr-l---chIETATLDGETNLKQRqv-

-----vrsfidldcefdplkynsviecekpnndlnrfrgyiihx-

-----sgrrdg
lyk-----
-----d-----NLLLR--GCTI-----r
nt---eeav-----gIVIYAGHETKAMInnngpry-----

-----krsklerqmnvdvfwcviiilvmclfsa
-ighglwmfqygdkr---xxfdvl-----xxxxxxspvvsaiylfltmlIVFQVL
IPISLFSiEIVKICQVY-Flhqdlel-----
-----ydeetdsh-----
-----IQCR-ALNITEDLGQMQUIFSDKTG-----
-----TLTENKMVFr-----rctvagvey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxd iptdpq--lxdvxxxxxxxxxxxxxxxx
xxxxxxxxxxx-----xxxx--df
fialtic---ntvv-----xxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxs|xxrx-----xxx-----xxx-----

-----xxxxxx-----
-----xx-----
-----xxfeaespede--aalvya---ar-a-----
-----ykca--l--vgrlpd-----qv-----
-----tvexxx-----l
gkl-----sfel|htlgfdstrk-rmsv---v--vk-----
-----x-p-----l-----xe-q-----
-----it-v-----y-----
-t-----k-----
-----gad
s-----vimdlirxtt-----xxxxxxx-----

xxx--xx--ykt-qnylnly--aad---glrtLCIAKKvl--skeeyaswlqrhle--
ae----taiqrreellfesalr--letnlqlLGATGIEDRLQDGVPETIASLRKag-LQI
WVLTGDKQETAINIAYACKL-----ldpeeii-----
-----tl-----nads--xx-----acaxxxx-----
-----x
xxxx-----xxxxxxxxxxxagxxxxxxxxxxxxxxx-----xxxxxx
xxxxxxxxxx-----xxrlglvidgrtlay-----
-----al-----
x-----ksledkf la-----

varscrsvLCC--RSTPLQKSMVVKLvr-----
--nk--lk-----v-----MTLAIGDGANDVSMIQVADVGVGI-----
-----sgqegmq-----

-----AVMASDFALPrfRYLQKLL--LVHGHWCYSRLANMI-----

-----xxxxxxxxxxxxxxxxxxxxxptkdvfg-----xx-----
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxx-----
---srtiyvgh-----

-----x-xxxxxxx-----

-----ppkfcdnr ivsskyt-----vw-----
-nflpknlfef-----
-----r-rianfyfl---iiflv
-qvi-----vd-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ka
dnevnkypvt-----vle-----

-----d-grs-----x-----k-----
-----k
e-----
---sekIKVGDVVEVve-----
---DETFCDLILLqs-----

-----sredg---xcfvTTASLDGESNHKTHyt-----

-----vpdier-----dlqvltaaieceqpqpdlykfvg-----
---xxxxxxx-----
-----eeavrs
lgp-----
-----e-----NLLLK--GATL-----k
nt---keiy-----gVAVYTGNETKMAInyqgksq-----

-----krsaveksinafllylciiskavvct
-tlkyvwskegqde---xwyne-----xxxxxxnmylkmftdfIsfMVLFNFI
IPVSMYVTvEMQKFLGSF-FIkwdndf-----

-----fdpeieeg-----
-----aLVN-TSDLNEELGQVEYVFTDKTG-----
-----TLTQNNMEFi-----eccidgfy-----

-----xxxxxxxxdghtvtdxxlxklqxxxxx-----
-----xxxx-----lf
lralclcl-----htvq-----xxxxx
xxxxxxxxxxxxpkxxxexx-----

-----fiasspde-valvkg-----am-e-----
-----ygft-f-lglenk-----nm-----
-----kirxx-----q
ndie-----eyklhvlndpvr-rmsv-----i-vq-----

-----t-----k-----xg-----d-----
-----tl-l-----f-----
-c-----k-----
-----gad
s-----sifprvrxe-----

-----xdri-rlhvern-atd-----gyrtLCVAYKql-saeeyaladtglre-----
ar-----lalqdreeklmamyng-vetgmslIGATAVEDRLQEEAAETMEALQGag-MKl
WVLTGDKMETAKSTCYACRL-----fqrgetell-----

-----el-----tvr-----xxxxxxxxedxxxx-----

-----xxxxxxxxdaxxxkxxxxxxxxxx-----
-----xeygfiiidgatls-----
-----vm-----xxxxxxx
x-----slyrglfq-----

icqncravLCC--RMAPLQKAQIVKMK-----
--nc--kg-----xp-----ITLSIGDGANDVSMILEAHVGIGI--
-----kgkegrq-----

-----AVRNSDYAIPKIKHLKKLL--LAHGHLYYVRI AHLV-----Q
yff-yknlc-filpqflyqffegy-----sqqp lydaayltmy
nicftsm pilayslleqhiaie-----illdnatlyreiaknamlrwrp
f-lywtvlgifqgliff-fgvrxlfs-----xxxxxxxxxv-----

fg--nwsygtivftvlfvtvltk-laldtrhwtwinhf-----viwgs lafyvffsff
wggiiw pf--xxxxxxx-----fvfanml-----
-----ssvsaw--lv--iiiiii lslpe-----
-----illavlr-----

-----xxxxxxxxr qtaavtpxxxxxxxxx-----

>cell IV_IV01 NP_503858.1

m-----

[illegible]

-----s d k s s - s -----c f I R T D Q L D G E T D W K L K i p -

-----i p f t q h l a n e s e i m e l n c e v y a e k p q k d i y s f v g t v k i x x
x x -----
-----k i h e g s
l d v -----
-----e -----N V L W A - N T V V -----
s s -----g t a i -----g V V V Y T G C E T R S V m n t t v p e y -----

-----k v g l l d l e i n n l t k l l f c f v l l l a s v m v
- l m k g p t s l -----w y l y -----l a r f I L L F S Y I
I P I S L R T N v D M A K L F Y S W - Q l g h d h h i -----
-----p e -----
-----t V V R - S S T I P E E L G R I S F L L S D K T G -----
-----T L T K N E M H F k -----k i h l g t v a f -----
-----x x x x x x x x x x x x x x x x -----

-----x x -----x x x
x x -----x x x f s a k - l k -----
-----n a
v e s l a l c -----h n v t -----
-----p v x x x -----

-----x -----x x -----
--x -----y q a a s p d e - v a l v k w -----t e - t -----
-----v g v k - l - a h r d l h -----t m -----
-----t l d -----v
q p s n - x x x x x x q f q i l h v f p f t s e r k - r m g i ----i --v k -----

-----x - e -----t -----x g -----e -----
-----v t - l -----y -----
- i -----k -----
-----g a d
t -----v m s d m v - x y x -----

A series of horizontal lines for handwriting practice, consisting of four sets of three lines each (top solid, middle dashed, bottom solid).

>cel IV_IV02 NP_001021458.1

m

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxcs|fsrxxxxx-----

---srtvrvgy

```
-----xxxxxxxxvntftptvcnqkyn-----if-----
```

—sfvpivlfqqf—

-----k-fflnlyfl----lmacs
-qfi-----paiqi-----gap---i-ty---wgp
lgfv-l-----titlireafdd-----fv-----ry---lr
drdlnsekye-----klt-----

-----x dxtri-----e-----
-----i
r-----
----sadIEVGDVIMhk-----
----DRRVPADVLLrt-----

-----tdksg-a---cfIRTDQLDGETDWKLrip-

-----vphtqhlpneadimeIncevyaeqpqkdi hafvgtlkixx
xx-----
-----nvqdgS
lnv-----
-----e-----NVLWA--NTVV-----
as---gtav-----gIVVYTGRETRSVmnttIpes-----

-----kvglldlevnnl tkllfcfvlvssvmv
-amkgldnl-----wry-----l mrfILLFSYI
IPISLRVNI DMAKLFYSW-Qlgrdkhi-----
-----pe-----
-----tVIR-SSTIPEELGRISFLLSDKTG-----
-----TLTKNEMHFk-----kihlgtvaf-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-----xxxfsak-lq-----
-----na
veaialc---hnvt-----
-----pixx-----

-----xtp rphl-----xx-----
-----XXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXX-----
---srvirpnh-----

-----XXXXXXXX-----

-----yrdftdnristtkyt-----fw-----
-nfiplniwhqv-----
-----sxkylanlyfi---fiail
-nwv-----pffda-----ytr---y-vg---lip
icfv-l-----gttlikdgied-----yr-----ry---kf
dnqinkktch-----vwd-----

-----xxr-caf-----x---k-----
-----t
e-----
---wryILVGDFVHIsn-----
---NQDVPADILLrs-----

-----ssesg-t---cyIETCNLDGETSLKQRmv-----

-----xxxvidyskkdstfkppdftgvvtcekpdksiytirakvefx-----

-----pgqsdv
iik-----
-----e-----NMLLR--GSRl-----k
nt---tfve-----glVYAGHDTKVMqnngraph-----

-----ktsgiekltnkfiiacfimllmvlyga
-itsavwvgqhpvde---xxxfils-----xxrxpfiegf igafFINYQLL
VPISLYITvEIIKALQIY-FIsndiqI-----

-----y dqksdra-----
-----iDCR-SLSIPEELGTVTHVLSDKTG-----
-----TLTENMMIFr-----ncafdetdy-----
-----XXXXXXXXXXXXXXXXXXXX
XX-----

-----XXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXiqfddrlxxixeedXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX-----sf
srklstv---xxrsil-----xxx
XXXXXXXXXXXXxfkxxmx-----

-----yeaespde---lalieg---aa-l---
-----ydyv---l---leraat-----sv-----
-----tisxxxxxx-----
-----ryeilltlpfdatrkrmsv---i---vn-----

-----xxxg-----
-----pl---m-----y---
-c-----k-----
-----gad
s-----aiisrlsxxsxx-----

-----xxxxqdl-kdhldny---akk---glrtLCFAMKyiskedfedfldsyrf---
lm---xdatsekmlsekade-letnlklSGVTGIEDRLQDGVPTLRALRDag-IQV
WVLTGDKLETAQNIATSSGL-----fhpqrslk-----

-----vi---etet-----daexxxx-----

-----xxglniimspairl-----

x-----qdgnahlme-----

alkkaktvLCY--RMTPEKATIVNTVk-----
--kr--ik-----g-----NVLAIGDGANDVPMIQAHHVIGI--
-----agkeglq-----

-----AAMACDFAIArfKFLSRLL--LVHGHWSYYRLANTF-----L
yfl-yknan-avfii fyyqfynga-----sgtnivdpiwgiy
piiftsvqpvvvgvldqdyddq-----tlmnpelyvigrenqlytwkh
f-frdvidgiyqaaviy-yvay-----xxxxxt-----

ss--lwemgyiatssilvnsgh-lalqvrywhwql-----valfsffilfnfaff
faecltaaxxxxxxxxxx-----wmpiham-----
-----gdprfw--yy--qfitvivalcprxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxyvfmtlrxxxxxxxxxxxxtt--xxxxxxp-----ltv
xxx
xxx
xxx
xxx
xxxxxxxxxxxxxxxx-----

>cell IV_IV04 NP_001022894.1

m-----

pteardn
nrhihlgk
xxxxxxx
aqrfcsnr istckyn gf
sflprflyeqf
r-rynniffl aiall
qqi pdvsp tgr y tt avp
flii-l svsalkeifed vk rr rs
dnkvnafsv e ilv
d ghw x e
k
q
wk dVSVGDFIRIdn
DSLFPADLLLLas

-----seqqg-m---aylETSNL DGETNLKIKqa-

-----lditstmtspeklsqfeseitceppsrhvnfnegniei-

-----ngvarh
fgi-----
-----d-----QLLLR-GARL-----k
nt---awif-----gAVIYTG HDSKLLmnskrapl-----

-----ksgtidvqtnyriiflffvlvalalisa
-tgseiwrgnnipqa-----wyls-----xxxxdpkgsflwgvltfFILYNNL
IPISLQVTIEVVRFFQAI-Ylnndiem-----
-----ydvnsdsc-----
-----aIAR-TSNLNEELGQVKFIMSDKTG-----
-----TLTRNVMKFK-----rIsigsrny-----
-----xxxxx-----

-----defadas--lxedyxx--x-----
-----xxxx-----xxxx-----ev
lkmmavc---htvv-----
-----p---exx-----xxx---xx-----

-----yqssspde--aalvrg---aa-s-----
-----qsvs--f--htrqpq-----kv-----
-----icn--x-----f
gede-----tieildvidftsdrk-rmsv---i--vr-----

-----xxa-----g-----g---d-----
-----ik--l-----y-----
-t-----k-----
-----gad
t-----viferlexk-----x-----

xxx--xx--eyc-tehledy--asf---gyrtLCFSMRhl--teqeysqwapeykk---
ai-----laidnraklladaaek-lernmi|VGATA|EDKLQEWVPET|QALMAad-IRV
WMLTGDKRETA|N|AHSCAL-----chnttell-----

-----iv-----dktt-----yeexxxx-----
-----xxxxxxxx|exx-----
-----xxgfamvidgksllh-----
-----a|-----
x-----gearkhfgd-----

lalrchavVCC--RMSPMQKAEVVEMVr-----
--kl--a-----xh-----VVLAI|GDGANDVAMIQAANVGVG|--
-----sgeeglq-----

-----AASASDYA|PrfHFLRRLL--LVHGAWNHDRSVKVI-----L
ysf-yknic-lyiie|wfamfsaw-----sgqtiferwtigmf
nviftawppvvlglfdhvpae-----qimkypalyasfq-nrafsign
f-s|wiglaivhslslf-fltyxtme-----xxxxxxxxxt-----

gg--wlmlgncaytfvvatvcfk-al|ecdswtwpvvv-----acigsiglwivfviv
yslvfphixxxxxxx-----gmaaimm-----
-----ssytfw--la--llfiplatllwd-----
-----lvikslf-----tiam-----p-----tpr
-----xxxxxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxrlltsslxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

XXXXXXXXXXXXXXXXXXXXX

-

>cel IV_IV06 NP_499363.2

m

lpqq

r l vvpnnq

XXXXXXXXXX

rkycgnr i sttkys

-tfipknlfeql

-v|

-----h-raanlyfi---fivil
-nmi-----iga-----fgk--y-is---vlp
iafv-l-----gitaikdafed-----yr-----ry---ks
dqkinhstcr-----vwd-----

-----xxq-qry-----x---k-----
-----|
e-----
---wqnILVGDFVHLsh-----
---DEIIPADILLrs-----

-----sdvng-v---cyVETCNLDGESNLKQRqa-

-----xxxxxkyhnanvp leyspaefnyriaceqpttdvykfegrl eaxx
xxxxx-----
-----arefti
lak-----
-----e-----NVLLR--GCVV-----k
nt---dfve-----gIVLYAGKDTKAMInnngpry-----

-----krsslekmtnvdi lwsvctllalcviga
-vlsqvwlr tfstpy-xxxxxvfihxxxxxxxxxxxxxxxxspsyeswfsfwsylIVLQVM
IPISLYVSIEFIKIFQVW-FMsqdrnm-----
-----yydkvdkr-----
-----IQCR-ALNITEELGQIQYVMSDKTG-----
-----TLTENQMVF r-----rcsvngndy-----
-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxx-----dpalesq--lxssvxxxxx-----
-----xxx-----xxx-----af
fltmaic-----ntvxx
xxxxxxxxxxxxpvxxxexx-----xxxxxxxx-----

[illegible]

yff-yknam-lvfvi-fwyqifngf-----saqvpidpvylmvy
nliftsvppllfgcldqdasae-----llldcprlyeqgrlgkryrwys
f-winmldavwqslvvf-ficy-fty-----xxn-----

```

vd-mwtfghllvtqliiivntfh-lalfvqywtwpmfw-----smflsvlfficall
yngfvtanxxxxxxxxxxx-----mvs|ksf-----
-----sslefw--ma--liisvvlcltpr-----
-----yvl|ttvv-----ntvs-----p-----stt

```

```
-----xxxxxxxxxxfkktesrxxxxxxxxxxxxxxxxxx
XXXXXXXXXXXXXXXXXX-----
```

-----XXX-

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxkssqdaq-----

-----xxxxxxxx-----
---krrvvvsr-----

-----xxxxxxxx-----

-----skgfqnnsirttkyt-----li-----
-sfipmnlfqf-----
-----h-raanlyfl---flvll
-nwv---pavea-----fqk---e-it---mip
lavv-l-----tviafkdated-----yr-----ry---ry
dkkinntlth-----vys-----

-----xxq-qry-----x-----e-----
-----r-----
r-----
---waeVCVGD LVRLcc-----
---NEIIPADMVLLhs-----

-----sdsng-v---chIETANLDGETNLKQRqv-----

-----vrdltqggaefvpenfssriecenpnndlrrfrgf-----
-----xxxx-----
-----gkvrvg
lhs-----
-----e-----NLLLR---SCTV-----r
nt---etvi-----gIVVYAGHETKAMqnnsgrpy-----

-----krsklerrlnldvlwsvalllmcfiaa
-ighglwlseledpi-----fmip-----xxxhpalaafymfwtmllVLQVL
IPISLYVSiEIVKLGQIY-Flqndldl-----

-----ynpvldtg-----
-----vQCR-ALNITEDLGQIQYLFSDKTG-----
-----TLTENRMLFr-----rctvagtey-----
-----xxxxxxxxxxxxxx-----xx
xxxxxx-xxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxx-----xxxxxx
xxxavvpdpq--lxmklxxxxxxxxxxxxxxxxxx
xxxxxx-----xx-----df
flaltvc-----ntvv-----xxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxx
xxx-----xxxxxp-----xx-----xxx-----xxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xx-----xxxxxxxxxxxxxx
xxxxxx-x-----xyyeaespede-aalvqa-----ak-a-----
-----ygct--l--lgrspe-----qv-----
-----lvaxxx-----t
gpl-----sisllhvlpfhsark-rmsv-----v-----vr-----

-----x-p-----l-----xg-----e-----
-----vv-v-----y-----
-t-----k-----
-----gad
n-----vimelakxxg-xxxx-xxxx-----

xxx-xx-el-t-qrhldqy--are-----glrtLCVAKKvl--geqeyeamkrhey--
ae-----tsienree|||esaer-letdltILGATG|VDRLQEEVPETIEALQEag-IKV
WVLTGDKQETAINIAACKL-----lrptdhil-----

-----ma-----ncds-xx-----acexxxx-----
-----x
xxxx-----xxxxx-xxdxxxxdxxxxxx-----
-----lvidgrtldy-----
-----al-----
x-----kelqgafld-----

ltcccrsvlCC--RSTPLQKSQVVRLVr-----
--dk--le-----v-----MTLAIGDGANDVSMIQMADVGVGI--
-----sgqegmq-----

-----AVMSSDFAISr fKFLRKLI--LVHGHWCYARLANMI-----L
yff-yknvvxdvnl fwyqffcgf-----sgstmtnswwliff
nllftsvpplvygvldkdsae-----tllklpdlyksgqnsqaylptt
f-wlnildafyqslvcf-fipy-fay-----xxxxx-----

-g--vfsfaspingsalliiillh-qviesrtltwihas-----llifsglfyyafvll
fsitcvtc-xxxxxxx-----gietkmm-----
-----seplyy---lv--cvlttvllallpr-----
-----mlsrafs-----ntic-----p-----sdl
-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxxrvssrpvpxxxxxxxxxxxxxxxxxxxx
xxxxxxxx-----

>dreIV_IV12 XP_001331862.1

m-----

xx xxxxxxxxxxxx

xxxxerqaeiclpqgar

gg

xxg-sek

x xxx k

y

wkeLRVGDFIRLrc

NEILPADVLLLst

-----sdpdr-l---chIETATLDGETNLKQRqv-

-----vrsfidldcefdplkynsviecekpndlnrfrgyi ihx-

-----sgrrdg
lyk-----
-----d-----NLLLR-GCTI-----r
nt---eeav-----gIVIYAGHETKAMInnngpry-----

-----krsklerqmnvdvfwcvii llvmclfsa
-ighglwmfqygdkr---xxfdvl-----xxxxxxspvvsaiy lfltm lIVFQVL
IPISLFVSiEIVKICQVY-Flhqdlel-----
-----ydeetdsh-----
-----IQCR-ALNITEDLGQMQUIFSDKTG-----
-----TLTENKMVFr-----rctvagvey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxd itdpdq--lxdkvxxxxxxxxxxxxxxxx
xxxxxxxxxxxx-xxxx-xxxx--df
fialtic---ntvv-----xxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxs lxxrx-xxx-xxx-----
-----xxxxxx-----
-----xx
-----xxfeaespde--aalvya---ar-a---
-----ykca--l--vgr lpd-----qv-----
-----tvexxx-----l
gkl-----sfel lhtlgfdstrk-rmsv---v--vk-----

-----x-p-----l-----xe--q-----
-----it--v-----y-----
-t-----k-----
-----gad
s-----vimdlirxxt-----xxxxxx-----

xxx--xx--ykt-qnylnly--aad---glrtLCIAKKvl--skeeyaswlqrhle---
ae-----taiqrreellfesalr-letnlqilGATGIEDRLQDGVPETIASLRKag-LQI
WVLTGDKQETAINIAYACKL-----ldpeeeii-----

-----tl-----nads--xx-----acaxxxx-----
-----x
xxxx-----xxxxxxxxxxagxxxaxxxxxxxxxxx--xxxxxx
xxxxxxxxxx-----xxrlglvidgrtlay-----
-----al-----
x-----ksledkfla-----

varscrsvLCC--RSTPLQKSMVVKLVr-----
--nk--lk-----v-----MTLAIGDGANDVSMIQVADVGVGI--
-----sgqegmq-----

-----AVMASDFALPrfRYLQKLL--LVHGHWCYSRLANMI-----L
yff-yknam-fvalifwyqfycgf-----sgsamvdqwyliiff
nlmfsafpqlitgtldkdvsa-----tlqelpqlymngqnseeykpy
f-wmnmidafyqslif-fipy-fay-----xxxxx-----

-d--lftwgtpittlaltillh-lgietktwtwmnwv-----sigfsmalfftvalc
ynascptc--xxxxxxx-----wtmqrl-----
-----gdplfy-----ll--cvvtpvaallpr-----
-----ycyracq-----gtlf-----p-----npv
-----xx
xxxxxxx-----
-----xxxxxxxxxxekslaspixxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

[illegible]

X

m-

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX

---artvwlgh---

-tfvpgvlyqqf-

-----k-fflnlyfl---vvacs
-qfv-----pslki-----gyl---y-ty---wap
lgfv-l-----avtmvreaavde-----vr-----rc---rr
dkemnsqlys-----klt-----

-----vxgkv-----q-----
-----v
k-----
---ssdIQVGDLLIVek-----
---NQRIPADMIFLrt-----

-----sektg-s---cfIRTDQLDGETDWKLRIg-

-----vactqrlpalgdIfsIsayvyvqkpqldihsfegnfrxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----pihes
lsi-----
-----e-----NTLWA---STVV-----
as---gtvi-----gVVIYTGKEMRSVmntsqskn-----

-----kvglldlelnrltkalfiaqvvlsvvmv
-alqgflgp-----wfrn-----lfrfVVLFSYI
IPISLRVNI DMGKSAYGW-MImkdeni-----
-----pg-----
-----tVVR-TSTIPEELGRLVYLLTDKTG-----
-----TLTQNEMVFk-----rhlgtvsy-----
-----xxxxxxxxxxxxxxxxx-----

-----xx-----xxx
xxxxxxxxxxxxx---xxxxxxx---xxxxxxxxvssr-ih-----
-----ea
vkaialc---hnvt-----
-----pvxxx-----

-----xxxxxxxxxxxxxxxxx-----xxxxxx
--x-----yqasspde-valvrw---te-s
-----vglt--l--vnrldt-----sl-
-----ql-
ktpa-xxxx--tyyi lqi f pfts esk-rmgi----i---vr

-----x-e-----a-----xg-d
-----it-f-----y
-m-----k-----gad
v-----amasiv--xyx

-----dwl-eeecgnm--are---glrtLVVAKKsl--teeqqdfenrynq
ak-----lsihdrnlkvaavves-lereme|LCLTGVEDQLQADVRPTLELLRNag-IKI
WMLTGDKLETATCIAKSSHL-----vsrnqdi h

-----vf-----kpvs-----nrg

-----xxxxxxxxxxxxx
-----dc alvis gds lev
-----cl-
-----ryyehefve

lacqcpavVCC--RCSPTQKAQIVRL Lq
--qh-ta-----x-----RTCAIGDGGNDVSMIQAADC G IGI
-----egkegkq

-----ASLAADF S IT qfKHIG RLL--MVHGRNSYKRSAALG-----Q

fvm-hrgmi-istmqavfssifyf-----asvplyqgflmvgv
atiytmfpvfl-vldqdvkpe-----mallpelykdltkgrlsfkt
f-liwvlisiyqggi lm-ygal-vlf-----d-----

```

qē--fvhvvaīsftalīltēllm-valtīrtwhwlmv-----aqllīslacylaslaf
lney-f-----dl̥sfī-----

```

-----ttrvfl-----wk-----vcvltlvsc|pl-----
-----yiikylk-----rkfs-----p-----psy

-----skl-----ss-----

```
>cneIV_IV01 XP_566703.1
```

m-----

-----XXXXXXXXXXXX

[illegible]

X-----XX

XXX-xx-
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-

-----xxxxxxx-----
--dyltdvdw-----

-----xxxxxxxxx-----

----xxxxxxxxxxxxxxxxxxxxlkgfernsvttgkyg-----pi-----
-tflpkfllsef-----

-----s-rsanlffl-----ftaci
-qqv-----pnvsp-----tgh--w-tt---ivp
lgvv-i-----iasafkeiked-----fk-----rh--as
drslnnnlaq-----vlv-----

-----d-qqf-----x-----l-----r
p
--wrrLRVGDIVRLea
--NSFIPADIVLlss

-----sepeg-l--cyVETANLDGETNLKIKqa-

-----hpstasltmphsvsllrghi lseppnsslytydgtfhlx
xxxxx-----aptkip
vgp
nt--gwvy-----QMLLR-GAQL-----r
-----gVI VNAGHETKL Mrateapv

-----krtaverqvnrqi lyfllilvlslvst
-igssirtwlfdkna-----wylr-----xxxxxnkarqfiediltfIIYNNL
IPI SLIMTmEVVKFQQAS-Llnsdldm

-----yyaptdtp-----
-----aLCR-TSSLVEELGQIAYIFSDKTG-----
-----TLTRNEMEFr-----ectifgtmy-----
-----xxxxxxxxxxxxx-----

-----ktfdfsrxaxedsxx--x-----
-----xxxx--ef
lsllsic--htvi-----
-----p--exx-----xxx--xx-----

-----yqasspde--aalvag--ae-m-----
-----lgyr--f--qtrkpk-----sv-----
-----fid--x-----n
getq-----eweilnvcefnssrk-rmst--v--vr-----

-----x-p--d--g--t-----
-----ik--l-----y-----
-t-----k-----
-----gad
t-----viferlax-----

xxx--xx--ept-lvhledy--ate--glrtLCLAYRdi--seeeysswsalynn--
aa-----sqmsgraealdkaev-ieqnqlLGATAVEDKLQDGVPDAlHTLQQag-IKI
WVLTGDRQETAInIGLSCRL-----isesmnlv-----

-----iv--ntet--avexxxx-----

-----xxxxxxxxqrxxd-----
-----xxelaliiidgkslty-----
-----al-----
x-----kdcsvfle-----

laimckavlcc--RVSP LQKALVVKLVk-----
--rs--t-----xa-----PLLAIGDGANDVSMIQAAHVGVGI--
-----sgveg lq-----

```

sg--lwvvgttlylavlltvlgk-aalisdvwtkytla-----aipgsfiftmialpl
yaiiapll-----xxxxxxx-----givprlw-----
-----adpvfy-----fv-----lllfpiicllrd-----
-----yvwkyyr-----rtyh-----p-----asy-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

```

```
>cneIV_IV02 XP_570157.1
```

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXaekrekrXXXXXXXXXX--
-----XXXXXXXXXXXXXXXXXXXXX-

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
xxxrrtvyvni-

-----XXXXXXXXXX-

-----xxvvryvrnkvrtskys-----li-
-tfipknlleqf-

-----r-rvaniyfl----flvil
-qlf-----sifga-----pna-q ig---mlp
llai-l-----gmtaikdafed-----wr-----ra---kl
dnevnnsatt-----klg

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXqxnm-----xxxxxxx-----xxxxxx
XXXXXXXXXX-----xx-xxx-----m
SXXX
xxxxwkkLEVGDVLLrd-
-----NEQVPADVIVLst-

-----snada-l-----cfVETKNLDGETNLKIRrs-----
-----lkatsaitseedleahfvvdseaphanlysyngvlryxx
xxxxxxxxx-----eekqea
iti-----
-----n-----ELLLR-----GCTL-----r
nt-----kwvi-----gMVIFTGSDTKIMInggetps-----
-----krskieket-----ilclita
-ilhgwyrs|sgtsa-----xwyep-----xxxxxxniyvdsviiffscLLIFQNI
VPISLYITvEIVKTIQAY-Flfqdvem-----
-----yyepydtp-----
-----cVPK-TWD|SDDLQI|EYIFSDKTG-----
-----TLTQNIMEFk-----kcsihgvpf-----
-----xxxxxxxxxxxxxxxxx-----

-----xxxxx-----xxxx
xx-ltliapd-----lxqhlxxxx-----
-----xxxx-----xxxx-----df
fralavc-----hsvl-----
-----adxxxqxx-----xxx-----xx-----

-----ykaespde-----aalvaa-----ar-d
-----igfp-f-----vsknsh-----fl-----
-----eiv-x-----l
gkpe-----kwiplrmlfsssrk-rmsv-----v-----ar-----

-----x-p-----n-----g-----k-----
-----iv-l-----f-----
-c-----k-----
-----gad
s-----viynr|s-xn-----x-----


```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

This image shows a sheet of handwriting practice paper. It features a series of horizontal dashed lines for tracing. At the top left, there is a dashed lowercase letter 'm'. At the bottom right, there is a dashed sequence of ten 'X' characters, 'XXXXXXXXXX'. The rest of the page is blank, with only the horizontal dashed lines visible.

grtiplqp

xxxxkspypanvvrnqkys

il

sfllplvfyeqf

-----k-fffnfyfl---vvals
-qfi-----palki-----gyi---v-ty---vap
lafv-l-----avtmgkeafdd-----ys-----ry---lr
drearstryl-----v|v-----

-----xx
xxxxxxxxxxextps-----xxxxxxs-----
-----t
p-----
----assIKVGDMVLLek-----
----NQRVPADMVLLtt-----

-----seeeg-t---cfIRTDQLDGETDWKLKva-

-----vgetqkmgeafvgsaegslyadppikdihtfygvftlxx
xxxxxx-----
-----tetstp
lsv-----
-----e-----NVLWA--NTVL-----
aa---gsav-----gL VVYTGKETRAVIntseagt-----

-----kmgtlekevnkmakilctvtfalsvllv
-alngfrgq-----wyiy-----vfrfLILFSSI
IPISLRVNIDMGKTVYAH-qlqtdkei-----
-----pe-----
-----tIVR-TSTLPEELGRVEYLLSDKTG-----
-----TLTRNEMELk-----klhmgtlvf-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xxxxxxxxxxxxx-----xxxxxxmtgr-vr-----
-----dt
vma|atc---hnvt-----
-----pvxxx-----

-----xxxx-----
--x-----yqasspde--vai vqw----te-s-----
-----vglt--l--tsrdrt-----sm-----
-----vv-----
rssa-xxxx--tfdi l s i f p f t s e s k - r m g i ----i---ir-----

-----x-r-----e-----xg--g-----
-----it--f-----v-----
-q-----k-----
-----gad
v-----vmski v--xkx-----

-----dwl--eetg n m--are---glrtLVLARKkl--seeayaafdkayra---
aq---xlpse s r a s s i t s v i s q x l e t e l e l L A L T G V E D K L Q E D V K S T L E L L R N a g - L K I
W M L T G D K I E T A T N I A V S S K L -----v a r g q y i h-----

-----qa---aklt-----tad-----

-----qxxxxxxxxxxxx-----
-----dcalvi dgeslql-----
-----sl-----
-----drfrsefi i-----

latqlpivVAC--RCSPTQKADVAKLlr-----
--ey--tk-----x-----TVCCIGDGGNDVSMIQAADVGVGI--
-----vgkegkq-----

-----ASLAADFSINqfSYLTKLL--LWHGRNSYKRS AKLS-----Q

fvi-hrgli-iaviqavfssifff-----apialyqgwlqvgy
atlytmavfsl-vldkdvned-----lallpelykeltkgrslsykt
f-ftwltisvyqggiim-llsl-llf-----e-----

-----kkvagi-----

>cneIV_IV04 XP_568665.1

-----xxxxxxlvprskk-----xx-----
-----xxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxx-----
--prsvfine-----

-----xxxxxxxx-----

-----xxxxahhfatnqnvtskyt-----vi-----
-tfvpknlfef-----

-----r-rvancffl-----aisil
-qff-----pkfst-----isp---g-lv----ilp
liiv-l-----aitalkdgyed-----ik-----rh---qa
dhrtnhaihv-----vlg-----

-----xxx
xxxxxxxxxd-ktf-----x-----p-----
xxxxxxx-----xx-xxx-----k
VXXX
xxxwvedVKVGDFVKIye-----
-----NEQFPADIIICat-----

-----seed-v---aylETKNLDGETNLKSRng-----

-----vpglshlnetaeacanahlridldppesnmfrlngavmnxx
xxxxxx-----
-----qhpihp
vtl-----

-----e-----TTMLR-GCVL-----k
nt---awvi-----glIVYTGEDTKIlrnagatps-----

-----krsmvekqmpqviiinlvilaiaivvca
-ivdhvnevlgwdeqq---xxwmly-----xxxxxnppingltvfanaFITFQNI
VPISLYISI EAVRTIQAA-Flywdrdi-----

-----xxkkdgvtt-----
-----tTAR-SWNLSDDLGGI EYIFSDKTG-----
-----TLTQNAMIFr-----qcsvggkiy-----
-----XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX-----

-----XXXXX-----XXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXkdleahd-----
-----XXXX-----XXXX-----gf
favlglc-----htvl-----x-----
-----XX-----XXX-----
-----XX-----

-----xxykaqspde--aa|vqs-----aa-d-----
-----vgfv--f--rgrdhn-----i|-----
-----rmsxxx-----s
depd-----eyel|hvlefnark-rmsv-----i---|r-----

-----xxd-----e-----xg-----r-----
-----if--|-----|-----
-c-----k-----
-----gad
n-----vifer|txn-----

xxx---xxekt-dqdlqyf--ase---glrtLCLAYRil--dpqvyerwakeyhn---
at---valqdreeqiesvsss-ierdliiLGATAIEDKLQDGVPTISDLKRag-IKV
WVATGDKLETAVAIGYTTNL-----ltdtnli-----

-----vv---regr--xx---igdxxxx-----

-----XXXXXXXXXX|rXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXX-----xxgfs|vieghalah-----
-----cf-----x
x-----eetea||la-----

|strcntv|CC--RVSP LQKAQ|VHL|k-----
 ---dn---|g-----v-----MCLA|GDGANDVSM|QAADVGVGI---
 -----sgeeg|q-----

```

-----AVNSSDYAIAqfRYLKRL--LVHGHWSYFRNSSMI-----L
nff-ykni i-gigvlfwfmiycgw-----sttyvfayvyllfw
nvfwtlvpviaiglfdrnidde-----tlmalpelyrasregkyfglmr
f-ayyifegvyqsaviyxflnxyvt-----xxxxxxg-----

```

```

ydxmyemsttqai gavmvanlf-sglnidawtgwvwf-----avwfgpfliwvftav
ysvippsxxxxxx-----gndvflf-----
-----rsaayw----fg--wpfvtti allpr-----
-----yliktf-----qnif-----p-----ndv
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxsrsrwprfxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----

```

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
```

```
>ehi IV_IV01 XP_650935.1
```

m _____

[illegible]

-----teesg-s---if IRTDQLDGETDWKLRra-

-----igetqkmdiqticensqfelneaphadvysfagtirixx

-----dpkiys
Inv-----
-----e-----NTAWA-NTIV-----
as---dmc-----aLVIYTGNDTRLArnrkqsgn-----

-----xkrktevsnflskilfcsimglsilmi
-mpdliqhp-----wfil-----vsltrfMILFSSI
IPISMRVNIDIAKMVYAF-Flnrdki-----
-----ag-----
-----aEVR-NSTLPEELGRVDFVLSDKTG-----
-----TLTKNEMTFq-----vlcmqseti-----
-----xxxxxxxxxxxxx-----

-----xx-----
-----xxxx-xxxxxxxxknpkfim-----
-----rc
vqamal----hnvt-----
-----psxxx-----

-----xxxx-----
--x-----yqasspde--valvkf---ae-s---
-----vgvv--l--eertfk-----ki-----
-----vl-----
nmpmxxxx--eyeiInvfpssstk-rmgi---i--vr-----

-----x-n-----k-----xn---e-----
-----iy--l-----l-----
-m-----k-----
-----gad
n-----vmskii--xdx-----

XXXXXXXXXXXXXXXXXX

-

>ehi IV_IV02 XP_655890.1

m-

xxxxieiplvsxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxx

prsvyrpe

xxxvqkyttknkvsnttrt wy

-sf | pms | fnqf

-----k-yfynlyfl---cnacs
-qli-----pifkv-----gmt---f-ty---fap
lvfv-v-----claickdaide-----ir-----ia---lr
dvklnneqfe-----

-----xxhxgef-----x-----p-----
-----v
k-----
----akdIQVGHILRLkk-----
----GQRVPADLVILqs-----

-----sdedg---xcfIKTDQLDGETDWKFRrc-

-----ikefqgldllslentifcidceapqnaivsftgrirk--

-----endtip
vsv-----
-----d-----NTAWA---NTVL-----
as---eeii-----gIVITYGKETRSSmnrngqrn-----

-----xkwgrvdmalnsvskvlfcimlglsilmv
-vpdlcrgifssfti-----vvvvrfMILFSSI
IPISIRVNIDISKLIYSM-Flstdeki-----
-----eg-----
-----aEVR-NSSIPEELGQVQFLLSDKTG-----
-----TLTKNEMSfk-----i|slgnqty-----
-----xxxxxxxxxxxxxx-----

-----xx-----
-----xxxx-xxxxxxxxstsk-lf-----
-----ec
ikalalc---hnvt-----
-----psxxx-----

-----xxxx-----
--x-----yqasspde--valvkf----te-l-----
-----vgit--l--kektyt-----tm-----
-----kl-----
dieg-xxx--kyeiInmfpfssstk-rmgv---i--v-----
-----s-----s-----xe--g-----
-----iv--l-----y-----
-m-----k-----
-----gad
s-----vmskli--xnx-----

-----ewl-geecgnl--akd---glrtLVFGKKvi--skedyeifkkefna--
as---samtdrdelitqsiak-iennlkvLCITGVEDELQDDVQQSLEMLRHag-IRT
WMLTGDKVETALCIAKSTRL-----igvdqevr-----
-----ef---fans-----
-----xxxxxxxxxxxxx-----
-----xxndglivdgstls|-----
-----vl-----
-----keipdkfir-----

falqaksवलCC--RCMPTQKAELVLLVk-----
--ks-gi-----RTCAIGDGGNDVSMIQAADVGLGI-----
-----egkegkq-----
-----ASMAADFSLKqfSHITRLL--LWHGRNSYIRSSDLA-----

fim-hrgmi-isimqai fsaifnf-----apvalfqgflimgy
atyytm l pvisl-ildervneq-----kvme f p d l y h q l q t k q r l s l s s
l-iawvslsilqaviim-flcm-vlf-----k-----

dt--flnvisisftalililiqlin-vgftirrnwniilg-----seifsiaiyfisffv
lksy-f-----dlsfv-----
-----fswqfw--wk--lvviilltsip-----
-----fiakffv-----qlif-----p-----pky

```
-----mtvenrrcxxxxxxxxxxxxxxxxxx
XXXXXXXXXXXXXXXXXX-----
```

-sci-----pfist-----vtp--i--ta--vip
 iiv-l-----cvsaireiied-----lk-----rh--rs
 dkefnkkfs-----tit-----
 -----d-gie-----x-----i-----
 -----r
 s-----
 ---sknIVVGDVLVILtk-----
 ---NEIIPCDCVPIys-----
 -----slpdg-i---ckVETAALDGETSLKTVyv-----
 -----pkqlskssenstldfkgmlecgfptsnfndfkgcfkfx-----
 -----geniit
 lds-----
 -----k-----NLLLQ--GSVL-----r
 kt---dkvi-----aVVCYTgKYTKQSlnsskpin-----
 -----knstldhrlnqfvlstvffqlilcsima
 xfaswkyknviqdeg---xwylh-----xxxxxstttysikkffgyFNLISYT
 IPISVGVTiEVCRFIQGN-IMemdddf-----

-----xxxxxxxegtekvvg-----
-----mKTN-NCSMIEEMGGVQYILSDKTG-----
-----TLTENKMQFs-----kcsiygeiy-----

-----xxvlsqsiqxxixdnpxxx-----
-----df-----
lyclslc-----nsct-----
-----iexxsxx-----

-----xxyssfspde-etlcda-----sk-k-----
-----ngvi--l--kehtqe-----yi-----
-----sldx-----l-----
gehq-----qfklicqieftssrk-rmsv----l--ve-----

-----r-----xg-----l-----
-----yi--l-----y-----
-c-----k-----
-----gad-----
n-----vitqlldxxs-----

-----xxxxkis-qihannf--ase----glrtLFIARRif--tpeeilqwkqkfds-----
-----xdplandikrqqmelyexlenhlellIGVTAIEDQLQEDVPSTISMLREag-LKI
WVITGDKMETAISVGLNCRL-----fisgqkmi-----

-----yf-----nhts-----elexxxx-----

-----xxxxxxxxxxskxxdxxxxx-----
-----xxtlgivihennidw-----
-----fi-----
-----khqkkfss-----

laikaesv ICC--RVSPKQKADIALCVk-----
--qm--tk-----t-----KCLTIGDGANDVPMLTHGDVGVI--
-----ygkegnq-----

-----AAITADFAIRrfKHLTKLI--LFYGRNGKYQITTLI-----K
fcf-yknaa-fflmdiwfatisnf-----tcqiiyddwvmtcf
ntfftslppaiaalfdyelpwe-----tiklypkshretftdkqykiks
f-vewylygglsilff-vify-fii-----xxxxx-xxxxxxv-----

ng--ftftvvtvttyslfysiylt-mfvytkrvngntiil-----sflgsillyiilyti
imfvpgms-xxxxxxx-----gwl-ftl-----
-----kqplfy---lm---iiismvitvfpq-----
-----ivsiyfq-----rrik-----p-----tnt
-----xxxxxxxxxxx-----

-----xxxxxxxxxpssidnqtxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxx-----

-----xxx-----

>ehi IV_IV09 XP_656739.1

m-----

-----xxxxxxxpekselr-----

---yptihlfd---

-----xxxxxkegfpdnsvkttkyy-----ww-----

-sfipvflfnqf-----k-yfinlffl----ivai l

-sci-----pqlsa-----asp--v-as---ivp

vcim-l-----gfscirellde-----fr-----kf---ra

dkklnkveyd-----klq-----

-----sxgnl-----x-----k-----i

k-----

---asqIYPGDILVLpn---

---NSRIPADGIPLqt---

-----tnedg---xvfIETSELDGESNLKQRlv-

-----pshfidksyedicklkgdflttqpdpnfdhfvgtfei--

-----esqsys
vse-----
-----k-----NFIPN-GCTl-----r
nt---erll-----IFIVYCGFDTKLAKnsskpk i-----

-----kfshtnrkfnrfvaialtfdfi v i last
-vcyftysy iyrkge---xwylp-----xxxnvwkqtvlhffsfLNMFSFL
VPVSCLVSI EFSKMFQML-FMsfsdsl-----
-----xxxxxx i genetkg-----
-----cMPW-TGTLNDELGLVEYVLSDKTG-----
-----TLTENEMKFi-----kcs idgymfxxxxxxxxxxxxxxxxxxxx
xx
xx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxpqn|qinxx|xtvkxxxxxxxxxxxxxxxx
xx-----ef
ircmaic---heav-----
-----snxxxkxx-----

-----xfqsgspde--ialcee---as-l-----
-----ngyi--f--tkrtqk-----si-----
-----flvx-----a
geeh-----qvdiqavfpfdsnrk-rmsv---l---vr-----

-----xxxg---t-----
-----lv--l-----y-----
-l-----k-----
-----gad
m-----ttlplmkxxexx-----

-----keaqmdvnkf--are---gyrtLVLGyKii--pdsvfiewmikydn---
ak-----slivgrdeavnaaise-iekdf tILGVSAVEDKLQDGVPETIQSLRRgg-IRI
WMITGDKVETAINIGSTCGL-----tqqekiih-----

-----mt-----tdnc--xx-----vIkxxxx-----

-----xxdysvvfdgvyina-----

-----vgklddfwn-----

ivlgakavICC--RVTPLIKGEIIKNAk-----
--nr--tg-----k-----VCLGIGDGGNDISLIKESDVGVGI--
-----fgkegtq-----

-----AAQTSYAVRkfRHLQKLI--YFHGRQALRRNTLIV-----K
lsf-yknva-filmqfwfgiqnaf-----sgqslyedliitlf
nmimtsmppvfigafeidipff-----sardypeahkeilkgnnftsit
sxvswlvlavysvmlyxlssxiitxxxxxx-----

gkxxgygcfsilisitstliltxmaIsikswniflvI-----gffvsfilsIvcill
vsfvpqmsxxxxxxxxxxxxx-----
-----sqpsty---lf--illyvilaitp-----
-----lllrnfc-----

-----xxxxxxxxxyqiiqevvxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----

-----k-raanfyfl---illil
-qai-----pqist-----law--y-tt---lvp
lllv-l-----gitaikdlvdd-----va-----rh---km
dkeinrntce-----vik-----

-----d-grf-----x-----i-----
-----i-----
k-----
---wkdIQVGDVIRLkk-----
---NDFIPADILLss-----

-----sepns-l---cyVETAELDGETNLKFKma-

-----xeitdqylqiednlatfdgfieeepnnrldkftgtl fw--

-----rnqsfp
lda-----
-----d-----KILLR--GCVI-----r
nt---dvch-----gLVIFAGADTKIMknsgktrf-----

-----krtkidylmnymvytiiivlilvsagla
-ighayweaqignys-----wyl y-----xxxxxtpsyrghnfwgylIVLNTM
VPISLYVSvEVI RLQSH-Flnwdlqm-----
-----yyaekdtp-----
-----aKSR-TTTLNEQLGQIH YIFSDKTG-----
-----TLTQNIMTFk-----kccingtiy-----
-----xxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxx-----lafydhy--lxeqixx--x-----
-----xx-----xxxx--qf
ffllsic---htvm-----
-----v---dxx-----xxx---xx-----

-----yqaaspde--galvna---ar-n---
-----fgfa--f--lartqn-----ti-----
-----tvs--x-----l
gter-----tysvlaifdfnsdrk-rmsi----i---vr-----

-----x-p-----e-----g--s-----
-----ir--l-----y---
-c-----k-----
-----gad
t-----viyerlh-----x-----

xxx--xx--qet-qdaldif--ase---tlrtLCLCYKei--eekefaewnkkfma---
as-----vassnrdealdkvyee-ierdliiLGATAIEDKLQDGPETISKLAkad-IKI
WVLTGDKKETAENIGFACEL-----ltdttic-----

-----yg-----edin--xx-----lhtxxx-----
-----xxxx-----
-----xxxsaxxxpxxxxxxx-xx-----
-----xxnraliiitgswlne-----
-----i|xx-----
x-----eqrqknfvd-----

lacecsavICC--RVTPKQKAMVVDLVk-----
---ry--kk-----a-----ITLAIGDGANDVNMIKTAHIGVGI---
-----sgqegmq-----

-----AVMSSDYSFAqfRYLQRLL--LVHGRWSYIRMCKFL-----R


```
yff-yknfa-ftlvhwysffngy-----saqtayedwfitly
nvl|yssl|pvl|mgll|dqdv|sd-----|sl|rfpgl|yvvgqrdl|lfnykk
f-fvsl|lhgv|tsmv|f-fipf|xayl-----xxxxxxxxxp-----
```

sd--yqsfavtmasalvitvnfq-igldtsywtfvnaf-----sifgsialyfgimfd
fhsagihvxxxxxxxxxx-----gtasnal-----

-----rqp*y*iw-----lt--iiltvavcllpv-----
-----vairfls-----mtiw-----p-----ses

```
-----xxxxxxxxxsvfrgasxxxxxxxxxxxxxxxxxx
XXXXXXXXXXXXX-----
```

-----XXXXXXXXXXXXXXXXXXXX-----

>rnoIV_IV03 XP_001062555.1

m-----

-----xxxxxxxxxxxxxxxxlrsiaee-----

---errarand-----

-----xxxxx-----

-----kfqyasnciktskyn-----il-----
-tflpvnlfef-----
-----q-evantyfl----fllil
-qli-----pqiss-----lsw--f-tt----ivp
lvlv-l-----titavkdatdd-----yf-----rh--ks
dnqvnsrhsq-----vli-----

-----n-gvl-----x-----q-----
-----e
q-----
---wmnVCVGDIIKLen-----
---NQFVAADLLLLss-----

-----sephg-l---cyIETSELDGETNMKVRqa-----

-----xpvtse|g-disqlakfdgeviceppnnkldkfsgalyw-----

-----kgnkfp
lsn-----
-----q-----NMLLR--GCVL-----r
nt---ewcf-----gLVIFAGPDTKLMqnsgrtkf-----

-----krtsidrlmntlvlwifglvcmgvila
-ignaiwehevgrf---xvylp-----xxxxxsaffsgflsfwsylllLNTV
VPISLYVSvEVI RLGHSY-Flnwdkkm-----

-----fcmkkrtp-----
-----aEAR-TTTLNEELGQVEYIFSDKTG-----
-----TLTQNIMVFh-----kcsinghsy-----
-----xxxxx-xxxxxxxxxxxxx-----

-----xxxxx-xxxx
xxxxx-----f l fwdps-- l x eavxx--x-----
-----x-----xxxx-----ef
fr l l s l c-----h t v m-----
-----se--exx-----xxx--xx-----

-----y k a q s p d e--g a l v t a-----a r -n-----
-----f g f v--f--r s r t p k-----t v-----
-----t v h--x-----l
g t s i-----t y q l l a i l d f n n i r k-r m s v-----i--v r-----

-----x-p-----e-----g--k-----
-----i r--l-----y-----
-c-----k-----
-----g a d
t-----i l l d r l h--p-----x-----

xxx--xx--n s t -t d h l n e y--a g d-----g l r t L V L A Y K d l--d e e y y e w a r r r l q--
a s-----l a q d s r e d r l a s i y e e -v e s d m m l L G A T A I E D K L Q Q G V P E T I A L L T L a n -I K I
W V L T G D K Q E T A V N I G Y S C K M-----l t d d m t e v-----

-----f i-----v t g h--x x-----l e v x x x x-----
-----x x x x-----x x x x-----x x
x x x x-----x x x x x x x x x s s x x x t x x-----x x x x-----
-----x x e y a l v i n g h s l a h-----
-----a l-----
x-----a d m e l e f l e-----

evagve

gceatdnsiktskys ff

nf l pvn l feqf

q r l anay fl ill fl

q l i p q i s s l a w y t t v i p

l i v v l s i t g v k d a i d d v k r h q s

d q q v n n r s v l i l v

n g r i x e

k n

w r n V Q V G D I I K L e n

D H P V T A D V L L L s s

-----sepyg-l---tylETADLDGETNLKVKqa-

-----xsatsdmednlellsafngevrceppnnkldrfsgt|sy--

-----lgdtyf
ldy-----
-----e-----RLLLR-GCII-----r
nt---dwcy-----gLVVYTGPDTKLMqnsgrstf-----

-----krthidhlmnvlvlwifmlggmcflls
-ighgiwesnrgyhf---xafilp-----xxxxxxssaassalafwsyFIVLNTM
VPISLYVSvEIIRLGNSY-Ylnwdrkm-----
-----fyapkntp-----
-----aQAR-TTTLNEELGQVEYVFSDKTG-----
-----TLTENVMIFn-----kcsingky-----
-----xxxxx-xxxxxxxxxxxxx-

-----xxxxx-xxxx
xxxxx-----fsfydkt--lxeavxx-x-----
-----x-----xxxx-|f
flclslc---htvm-----
-----se---exx-----xxx---xx-----

-----yqaqspde--galvta---sr-n---
-----fgfv--f--hsrtpe-----ti-----
-----tvi--x-----m
grvr-----vyrllaildfsnerk-rmsv---i---vq-----

-----x-p-----e-----d---r-----
-----vm--l-----f-----
-c-----k-----
-----gad
t-----iiyel|h-p-----x-----

XX

```
>rnoIV_IV06 XP_234937.3
```

[illegible]

-----xxxxxxxxxxedkdtf-----

---twevkand-----

-----XXXXXXXXXXXX-----

-----xxxxxqkkyksnaihtakyn-----vf-----

-----sf|p|n|yeqf-----

-----r-rvsnyfl---fiiil
-qsi-----peist-----lpw---f-tl---fap
lvcl-l-----miraardlvdd-----ig-----rh---rs
driinnrpcq-----ilk-----

-----g-ksf-----x-----w-----
-----k
k-----
----wknLCVGDVVCLsk-----
----DNIVPADLLLLas-----

-----tepss-l---cyLETADIDGETNLKFRqa-

-----xmvthheltspkmasfgi vtceepnsrmhhfvgslew--

-----nsrkyp
ldi-----
-----g-----NLLLR--GCKI-----r
nt---dtey-----gLVIIYAGLDTKIMkncgkihl-----

-----krtkldlmmnklvili fmslviasmflt
-lgfafmvkefkakh-----hym-----xxxxtdamsffifwgfLILLSVM
VPMAMFI laEFIYLGNSI-Flnwdlsm-----
-----yyepldip-----
-----aKAR-STSLNDHLGQVQYIFSDKTG-----
-----TLTQNIMTFk-----kccingcty-----
-----xxxxxxxxxxxxxx-----

-----x-xxxx
xxxxx-----lqfynke--lxl vxx-x-----
-----xx-----xxxx---ef
wrllaic---htvm-----
-----v---qxx-----xxx---xx-----

-----yqaaspde--ea|vaa-----ar-n-----
-----fgyv--f--|srtqd-----ti-----
-----tlv--x-----l-----
geer-----vyqv|ammdfnsvrk-rmsv----l---vr-----

```
xxx--xx--att-eev|aaf--aeq----t|rtLCLAYKdv--adaykewepqhqe--
aa-----| | |qnraqa|hqvynk-|eqn|q|LGVTA|EDKLQDGPET|RCLKKgN-|KM
WVLTGDKPETAVN|GFACQL-----|senmsi|-----
```

IaskcqavIGC—RVTPKQKALVVALVk—
 —ky—qq—v—VTLAIGDGANDVNMIKTADIGVGL—
 —agqegmq—
 —AVQNSDYVLAqfCYLQRLL—LVHGRWSYMRICKFL—R

```
yff-yktva-smmaqiwfslfngf-----saqplyegwflalf
nllstlpvlyiglfeqdvtae-----kslkmpelytagqkdelfnysi
f-vqaiahgtitslinf-fvtixvsv-----xxxxxxxxs-----
```

```
-----xxxxxxxxxxmr|rrgmpxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
```

```
>rnoIV_IV07 XP_001055184.1
```

x-----xxxglqqwq-----

---qrrgesew-----

-----xxxxxxxx-----

-----rycsednr ihtskyn-----il-----
-tflpinlfeqf-----
-----q-rvanayfl---fllil
-qli-----peiss-----ltw---f-tt---ivp
lvlv-i-----smtavkdatdd-----ff-----rh---ks
dnqvnrrqse-----vli-----

-----n-skl-----x-----n-----
-----e
k-----
---wmnVKVGDI IKLen-----
---NQFVAADLLLLss-----

-----sephg- l---cyVETAELDGETNLKVRqa-

-----xpvtselgadisslakfdg ivateapnnkl drfsgv lsw-

-----kds kht
l sn-----
-----q-----KIILR--GCVL-----r
nt---swcf-----gMVLFA GPDTKLMqns gktkf-----

-----krtsidrlmntlv lwifglvclgiila
-vgnsiwesevgnqf-----xtslf-----xxxxxsslfsgfltfwsyV I I L N T L
VPI SLYVSvEVI RLGHSY-Flnwdrkm-----

-----yyaakamp-----
-----aEAR-TTTLNEELGQIEYIFSDKTG-----
-----TLTQNIMTFk-----kcsingrvy-----
-----xxxxx-xxxxxxxxxxxxx-----

-----xxxxx-xxxx
xxxxx-----lhffdhs--lxesixx--x-----
-----x-----xxxx-----ef
lrllalc-----htvm-----
-----se--exx-----xxx--xx-----

-----yqvqspde--galvta----ar-n-----
-----fgfi--f--ksrtpe-----ti-----
-----tie--x-----l
gtpv-----tyqllafldfnnirk-rmsv----i--vr-----

-----x-p-----e-----g--q-----
-----ik--l-----y-----
-s-----k-----
-----gad
t-----ilfeklh-p-----x-----

xxx--xx--s|t--sdhlsef--age----glrtLA|AYRel--ddkyfkmwqkml--ed--
an-----saiaerderisglyee--ierdlm|LGATAVEDKLQEGVIETITSLSLan--IKI
WILTGDKQETAINIGYACNV-----ltdamdav-----

-----fv-----itgn--xx-----vevxxxx-----
-----xxxx-----xxxx-----xx
xxxx-----xxxxxx--xenxxx|xxxxxxxxxx-----
-----xxeyalvingslah-----
-----a|-----
x-----sdvekd|le-----

m-

[illegible]

-----sekag-s---cfIRTDQLDGETDWKLKva-

-----vsctqr lpalgdIfs isayvyaqkpqldihsfegtfrxx
xx-----
-----ppihes
lsi-----
-----e-----NTLWA-STIV-----
as---gtvi-----gVVIYTGKETRSVmntsnpkn-----

-----kvglldlelnqltkalfalvvlsvvmv
-tlqgfagp-----wyrn-----lfrfLLLFSYI
IPISLRVNIDMGKAAYGW-MImkdeni-----
-----pg-----
-----tVVR-TSTIPEELGRLVYLLTDKTG-----
-----TLTQNEMVfk-----r lhlgtvsy-----
-----xxxxxxxxxxxxx-----

-----xx-----xxx
xx-xxxxxxxxxx-xxxxxxx-xxxxxxxxvssr-ih-----
-----ea
vkaialc---hnvt-----
-----pvxxx-----

-----xx-xxxxxxxxxxxxx-----xxxxxx
---x-----yqasspde-valvrw---te-s---
-----vglt--l--vsrdla-----sm-----
-----ql-----
ktps-xxxx--tyci lqmfptsesk-rmgi---i---vr-----

-----x-e-----a-----xa-----e-----
-----it--f-----y-----
-m-----k-----
-----gad
v-----amstiv--xyx-----

-----dw|--eeecgnm--are---glrtLVAKRtl--teeqyqdfesrysq---
ak-----|sihdrtlkvaavves-lereme|LCLTGVEDQLQADVRPTLEMLRNag-|K|
WMLTGDKLETATCIAKSSHL-----vsrtqdiH-----

-----if-----rpvt-----nrg-----

-----xxxxxxxxxxxx-----
-----dcalvisgdslev-----
-----c|-----
-----ryyehe|ve-----

lacqcpavVCC--RCSPTQKAHIVTLR-----
--qh--tr-----x-----RTCAIGDGGNDVSMIQAADCGIGI--
-----egkegkq-----

-----ASLAADFSITqfRHIGRLL--MVHGRNSYKRSAALG-----Q
fvm-hrgli-istmqavfssvfyf-----asvplyqgf|mvgy
atiytmfpvfsl-vldqdvkpe-----mailypelykdltkgrslsft
f-liwvlisiyqggilm-ygal-|lf-----e-----

ae--fvhvvaisftaliltellm-valtirtwhwlmvv-----aefls|gcyvaslaf
lney-fgixxxxxxxxx-----dvafi-----
-----ttvtfl--wk--vsaitvvsc|pl-----
-----yvlkylk-----rkls-----p-----psy

-----skl---ss-----

A sheet of white paper designed for handwriting practice. It features four identical sets of horizontal lines, each consisting of three parallel lines: a solid top line, a dashed middle line, and a solid bottom line. These sets are arranged vertically down the page, providing ample space for practicing letter formation and alignment.

>rnoIV_IV09 XP_344902.3

m

-----xxxxxxxxxxxxxxxxxxxxrrrwegr-----

```
---trtvrsnl-----
```

-----XXXXXXXXXXXXXXXXXXXX-----

```
-----xxxxxxx|qhladnr|kttkyt-----||-----
```

—sf|pkn|feqf—

-----h-r l anvyfv---fiall
-nfv-----pavna-----fqp---v-la---lap
vlfil-----avtaikdlwed-----ys-----rh---rs
dheinhlgcl-----vfs-----

-----xxe-kky-----x-----n-----
-----r
y-----
----wkeIRVGDFVRLcc-----
----NEIIPADILLss-----

-----sdpdg-l---chIETANLDGETNLKRRqv-

-----vrgfselvsefnplfttsviecekpnndlsrfrgci ihx-

-----ngekag
lhk-----
-----e-----NLLLR--GCTI-----r
nt---eava-----gI VIYAGHETKALInnsgpry-----

-----krsqlerqmncdv lwcvlllvcis lfsa
-vghglwvrryqekk---xxfdvp-----xxxxxxspataavysf ltmI lVLQVL
IPISLYVS iEIVKVCQVY-FInqdiel-----
-----ydeetdsq-----
-----IQCR-ALNITEDLGQIKYIFSDKTG-----
-----TLTENKMVFr-----rctvsgiey-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxx-----xxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxd i tdpk--l xekxxxxxxxxxxxxxxxx
xxxxxxxxxxx-----xxxx--df
fialtic---ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx--xxxxn lxxxk-x-----xxx---xxx-----

-----xxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxx-----
-----ak-a-
-----ynca--l--vdr lhd-----qv
-----svexxx-----|
gr l-----tfel hltlgfdsirk-rmsv---v---ir

-----x-p-----l-----xd-e
-----in-v-----y
-t-----k-----
-----gad
s-----vvmdll | xxs-----

xxx--xx--skt-qnylnly--ave----glrtLCIAKRvl--skeeyacwIqshie--
ae----tsvesree I lfqsavr-Ietnlhl LGATGIEDRLQDGPETIAKLRQag-LQI
WVLTGD K Q E T A I N I AYACKL-----ldhg eev i-----

-----tl-----nads-xx-----acaxxxx
-----X
XXXX-----XXXXXX--XSvXXXXXXXXXXXXXXXXXXXXXXX
XXXXXX-----slvidgrslay
-----al
x-----ksledkfIf-----

lakqrsv LCC--RSTPLQKS MVVKLVr--
--nk--lk-----a-----MTLAIGDGANDVSMIQVADVGVGI--
-----sg q egmq

-----AVMASDFAvPrFRYLERLL--IVGHWCYSRLANMV-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxsettp||-----xx-----
-----xxxx-----

-----xxxxxxx-----
--qrvvypnn-----

-----xxxxxxxxxxxx-----

-----rrypgnsicttkyt-----||-----
-tflpqnlfeqf-----
-----h-rwanlyfl---flvil
-nwm-----psmev-----fhr---e-it---mlp
laiv-l-----lvimvkdgted-----fk-----ry---cf
dremnsasiq-----iye-----

-----xxe-qsy-----x-----q-----
-----k-----
r-----
--wqdVRVGDFVQMrc-----
--NEIVPADILLfs-----

-----sdpsg-v---chLETANLDGETNLKQRv-----

-----vkghsqgevfqpehfhti vcekpnnhl skfkgymehx-----
-----detrtg
fgs-----
-----e-----SLLLR-GCTI-----r
nt---evaa-----gIVIYAGHETKAMInnsgpry-----

-----krskierrintdiffciglflmcliga
-vgshlwngtfkehp---xdfvp-----xxxxxxxspalggfymflmtl ILLQVL
IPISLYVSIELVKLGQVF-LLhndldl-----

-----ydeetdls-----
-----iQCR-ALNITEDLGQIQYIFSDKTG-----
-----TLTENKMVFr-----rctivgney-----
-----xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxdvtpdkn--l xskvxxxxxxxx-xxxx
xxxxxxx-xx-----xxxx-----df
flaltic-----nsvm-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx-----xxxx-fxxxaxx-----xxx-----xxx-----
-----xxxx-----
-----xxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxx-----xyeaeaspde--aalvha-----ar-a-----
-----ysft--l--vsrtpe-----qv-----
-----tvrxxx-----g
icl-----tfdl lftlgfdsvrk-rmsv--v--vr-----

-----x-p-----l-----xg--e-----
-----iv--v-----y-----
-t-----k-----
-----gad
s-----vimdllexxxxxxxxx-----

xxx--xx--art-qkhldly--ard----glrtLCIAKKvv--needfqrwasfrre--
ae-----asldnreel lmetaqh-lenrlt lLGATGIEDRLQEGVPDTIAALREag-IQL
WVLTGDKQETAVNVAHSCKL-----ldqadtvy-----

-----si-----nten--xx-----tcexxxx-----
-----x
xxxx-----xxxx--xxqxxxxxxxxxxxxxx--xxxxx
xxxxxx-----glvidgktlna-----
-----if-----
x-----gklenkfle-----

m-

-----xx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxtprpagk-----

---hrvvipl-----

-----xxxxxxxxx-----

-----gtyvnnrirttkyt-----||-----
-nfvpnr|feqf-----

-----h-raanlyfl----flvv|
-nwv-----plvea-----fqk--e-it--mlp
lvvv-l-----tiiaikdgled-----yr-----ky--ki
dkqiinnlitk-----vys-----

-----xxe-kky-----x-----d-----
c-----
c-----wknVTVGDFIRLsc-----
-----NEIIPADMVLLfs-----

-----tdpdg-i---chIETSGLDGESNLKQRqv-----

-----vrgyaeqdsevdpekfssr iecespndlsrfrgf-----
-----xxxx-----
-----nkervg
lsk-----
-----e-----NLLLR-GCTI-----r
nt---eavv-----gIVVYAGHETKAMInnsgpry-----

-----krsklerrantdvIwcvllIivmcltga
-lghgiwlsryenml---xfnip-----xxxxxxspvltgfyvfwtmlILLQVL
IPISLYVSiEIVKLGQIY-Flqsdvef-----
-----ynekmdst-----
-----iQCR-ALNITEDLGQIQYLFSDKTG-----
-----TLTENKMVFr-----rcsvagfdy-----
-----xxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxx---xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxxxxdvpdtr--lxdkfxxxxxxxxxxxxxxxxx
xxxxxxx-xx-----xxx-----df
fialaic---ntvv-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx---xxxxxsIxxxkxx-----xxx---xxx-----
-----xxxxxx-----xxxxxxx
xxxx-xxxxxxx---x-----xxx-xxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxx
xxxxxxxxxx-----xyyeaespde--aaIvya---ar-a---
-----yhct--l--rsrtpe-----qv-----
-----vvdxxx-----l
gpl-----tfqllhiIpfdsvrk-rmsv---v---vr-----

-----x-p-----l-----xk---q-----
-----vv--v-----y-----
-t-----k-----
-----gad
s-----vimellsxss-xxxxxxxx-----

[illegible]

S

-----XXXXXXXXXXXX

X-----XX

```
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx|apaaqg-----xx----
```

-----XXXXXXXXXXXXXXXXXX-XXX-----

-----XXXXXXXXX-----

---srtiyvgh-----

-----XXXXXXXXXXXX-----

-----pqrypdnr ivsskyt-----fw-----

-nf ipkn lfeqf-----

-----r-r-ianfyfl----iiflv
-qli-----id-tp-----tsp--v-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ka
dsamnqcpcvh-----fiq-----

-----h-gkl-----x-----r-----k
q-----srkLRVGDIVMVke-----DETFCDLIFLss-----nradg-t---chVTASLDGESSHKTHya-----vqdtkgfhtheadvs|hatieceqpqpdlykfvggrinvxx
xxx-----dpvvrp
lgs-----e-----NLLLR-GATL-----k
nt---ekif-----gVAIYTGME TKMAInyqsksq-----krsaveksmntfli vylci lvs kalint
-vlkyvwqsepfrde---xwynq-----xxxxxxxxxlfraftdf lafMVLFN YIPVSMYVTvEMQKFLGSY-FItwdedm-----fdeemgeg
-----pLVN-TSDLNEELGQVEYIFTDKTG-----TLTENMAFk-----eccieghvy-----

-----xxxxxxxxxlpdssgi xxi xssp xxxxx
-----xxxx-----lf
fraiclc---htvq-----xxxxx
xxxxxxxxxxx-pd-xxsx

-----y i s s p d e-----v a l v e g-----m q-r-----
-----l g f t--y--l r l k d n-----y m-----
-----e i l x x-----e-----
n d i e-----r f e l l e v l t f d s v r r-r m s v-----i-----v k-----

s t xg e
i y l f
c k
gad
s s i f p r v i x x k

-----xdqv-rsrvern--ave----glrtLCVAYKrI--epeqyedacrIIqd--
ak-----valqdrekklaeayeq-iekdlIILGATAVEDRLQEKAADTIEALQKag-IKV
WVLTGDKMETASATCYACKL-----frfstqII--

```
-----e|-----tthk-xx-----egsxxxx-----
```

-----XXXXXXXXXXCSXXtXXXXXXXXXX-----

-----xxdygliidgaalsl-----

-----im-----XXXXXXXX

x-x-----gnyrelfle-----

icrnscavLCC--RMAPLQKAGIVKLlk-----

---fs---ke-----xp-----|TLA|GDGANDVSM|LEAHVG|GV---

-----igkegrq-----

-----AARNSDYAIPkfKHLKKML--LVHGHFYIIRISELV-----Q

```
yff-yknvc-fifpqflyqffcgf-----sqqtlydtayltly
nisftslpillyslmeqhvgid-----vlkrdpslyrdiaknallrwr
f-iywtfllgvfdalvff-fgayxmfe-----xxxxxxxxxm-----
```

>rnoIV_IV13 XP_342229.3

-----xxxxxxxshsqssssxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxx-xxx-----

-----xxxxxxx-----
---trtiyian-----

-----xxxxxxx-xx-----

-----pqkfidnr i isskyt-----vw-----
-nfvpkn l feqf-----
-----r-rvanfyfl---i i flv
-qlm-----id-tp-----tsp---i-ts---glp
lffv-i-----tvtaikqgyed-----wl-----rh---ns
dnevngapvy-----vvr-----

-----s-ggl-----x-----k-----
-----t
r-----
---skn l RVGD l VR l ak-----
---DE l FPAD l VLLss-----

-----dr l dg-s---chVTTASLDGETNLKTHvs-----

-----vpeta vlqtvan l dsl i aviecq qpead l yrfmgrmi i xx
xx-----
-----eeivrp
l gp-----
-----e-----SLLLR--GARL-----k
nt---keif-----gVAVYTGMETKMA l nyksksq-----

-----krsaveksmntfliiyl i l i l i sea i ist
-i l kytwqaeekwde---xwynq-----xxxxxxxskilrfisdf l afLVLYNFI
IPI SLYVTvEMQKFLGSF-Flgwd l d l -----

-----yheesdqk-----
-----aQVN-TSDLNEELGQVEYVFTDKTG-----
-----TLTENEMQFr-----ecsinglky-----

-----xxxxxx--xxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxx-xxxxxrtspesexxlxkehx-----
-----lf
fkavslc-----htvq-----xxxx
xxxxxxxxxxxxxn|xxxqxx-----

-----yyasspde--kalvea--aa-r-----
-----agi--f--igisee-----tm-----
-----evkx-----l
grve-----ryklhlhlefdsdrr-rmsv--i--vq-----

-----xxxg--e-----
-----kl--l-----f-----
-a-----k-----
-----gae
s-----silpkcixxex-----

-----akt-rihvdef--alk--glrtLCIAYRqf--taeeyedvnrrlfe-----
ar-----tslqrqeeklagvfqy-iekdlvILGATAVEDRLQDKVRETIEALRMag-IKV
WVLTGDKHETAVSVSLSCGH-----fhrtmnil-----

-----el--xnqks-----dsgxxxx-----

-----xxxxxxxxxdh-----
-----xxqhglvvdgtslsl-----
-----al-----
-----rehek|fme-----

[illegible]

[illegible]

-----agy-vetykky--trq---gsrvLALAYKll-----
-----xdmpvnearslerdxvesdltfAGFAVFNCPIRSDSGAVLQELEQss-HDL
VMITGDQALTACHVAGQVHI-----cs--kpvI-ilt
rtk-----tg-----
-----g-----xxxxxxx--tdr
apysaee-----
-----vaavxgshd-----
-----lcisgdcfe-----

-----mlq--r-tdaviq-----

vipyv--kVFA--RVAPEQKELVLTTFk-----
---tv--gr-----VTLMCGDGTNDVGALKQAHVGIALxx
xxxxxxxxxxxxxxxxsksexxx
xxxxx-----xxxx
xxxxxxxxxxxxxxxxxxASMASPFTAKh-ASVAPTLdiIRQGRSTLVTTLQMF-----K
ilg-Inc-l-atayvlsvmyldg-----vklgdvqatis
gvftaaff-lfisharpl-qt-----lsaerph-----xnifcayv
f-lsilgqfamxxfflisavneatkympeexxxx-----

se---fhpnlvntvsymvnmmi-qvatfavnymghpfng---sitenkpfkyaalyaa
vafftvitxxmfrdld-----ymklepl-----
-----pegmr---gk--lmlwaiImfcgc-----
-----ygweril-----

-----xxxxpgkmpawexrqkxxxxxxxxxx-----

e

>aniV_V101 EAA63717.1

m

-----XX
XX
XX
XXvripyl
hXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXvtlrpllrwfrgdssytnsksrtwyggp
gsmplssmngarhprndpqsgnnywrpdiepqnhgvttvhgspxxxxxxxxpxxxxx
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----peansgsaeicrlqrdtlggvxxxxxxxxxxfyperkcfaflsyv
ldaepkpaxx-----
-----xxxeglttk-----

-----xiervqhygdntfdipvp-----
-----fielw-----

-----xxxxxapffvfq--i fcvg
lwm|-----deywyyslf
tlfm-----lvmfestvvwq-----xx---rt
lnefrgmnik-----

-----pyd-vwv-----
----yre-----rk--wqe-----i
t-----
----sdkLLPGDLMSVnr-----
--xxeDGGVACDILLleg-----

-----sviVNEAMLSGESTPLLKes-

-----xxxxxxxxxxxxx-----

ldk-----
-----x-----AFVHG--GTKVlqixxxxxxxxxxsqq
kt----skvg-----xxxxxxxxgVVVKTFETSQGsivrtniy-----

-----xtervsannaeallfilflifalaaswy
-vwqegvskdr-----krskllldcVLIITSV
VPPELPMELSLAVNTSLA-ALskfa-----

-----iFCT-EPFRIPFAGRVDVACFDKTG-----
-----TLTGEDLVVx-----xxxxlalgq-----

-----xxxxxxxx
ahtelskxxxxx-----
-----dt
tlvlasa----halv-----
-----kldeg-----

[illegible]

ila-lnc-l-isayslsviyldg-----ikfgdgqvtis
gmlmsvcf-lsirsaksv-eg-----lskerpq-----xnifnvyi
i-gsvlgqfaixxatlilylsnyvysieprdx-----

```
-----kr|fsdfrxkdiXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX-----
```

a

-----xxxxxxxtykyrsngalyir|spvfllsv|allf

rpeflaklrsvwigcltltetepgrhelsslrdidfrlfvktlk|xxxxxxxxvxxxxx
xx--

-----nrtnrvlplyrtgfiyyihdxxxxxxxxxxepvehfdevqvpkv
lswqgl|sxxx-----

-----xxxxxsg|epnl-----

-----nvcadlfgpndyeiprcx-----
---xxxxl|leaf-----
-----xapffvfq--ltstl
lwif-----ddylyysli
sifs-----lvmievqtvyk-----xx--le
ynrin smklp-----

-----pfq-iyv-----
----frd-----hk-wqv-----t
h-----
----tnlYPGDIIFlttxx
xxxxdILICPCDCLILdg-----

-----eviVDESILTGESVPQFKts-

-----xxxxxx
nqr-----
-----x-----STIFS-GTSlivtx-----nva
vt---gtpaxxxxxxxxxxxxxxxxxxxcLVIRTFESYQGr|vhsi|n-----

-----xxpnkvgsntqgymf|f|lmlfavsavvf
-vvrnsnyk-----s|kk|||vsSRILVSV
IPPEFPVTiSMAVTIGLI-QLrkkg-----

i YCT-APNRLPLAANIDVIAFDKTG
TLTQDQMYLx-xxxxsdsvn-

xxxxxxxxxxxx
slargsvxxxxxxxxxxxxxxxxxxxxxxxxxx-ys
klviagc-hslt-fvnga

itgdpmekisftyfnnqxt-xxxnii-
xxxxxxxxxxxxki lkrwftselg-rmstxxx

xxxxxxxxxxxxxxxx-xxxxxxxxxl-t-k-gsp
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syf-devchdl-tik-glrvLCLAYKrl-xdipvnal itdrtxvekdlefCGFLALEAPIKKSSKQCMKRLKN-FKK
IMITGDNILTACYVTQQINM-vnxxttcpxnfs
qkn-xxxxxxxxxxxxhs lfxxxxxxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxnsy
kkflescpfxx
xxxxxxxxskttppvsxx
xxsitgnilq-

lllnnnxtn-xxxxxxxxxxxxxxxxxxxxxxxxxxxx

XX-----

i innc--nVFA--RMSPQQKEF I IKCYk-----

xxxxxxxxxxxxxxxxmdne-----

-----xxxxxxxASIASPFTYHg-SDVNCVF_nIKSGRCSLYNLFMLY-----K

svlytylv-islnkskgi-dv-----ssdkkpe--x---sifspcn

XXX-----

yft|||fixx|vkplns-----ffs|vpi-----

-----fviskai-----

-----nffyys|-----

d

>hsaV_V101 NP_065143.1

-----ekwxxxxxxxxxx-----
-----dpskatfvkvvptpnngste|xxxxxxxxxxxxxv|sfefqkikysyd
alekkqflxxx-----
-----xxxxxxxxxxxxxrgfqeds-----
-----xiraaekkfgsnkaemvvpX-----
-----fself-----
-----xxxxxapffvfq--vfcvg
|wcl-----deywyysvf
t|sm-----|vafeaslvqq-----xx-----rn
mseirkmgkn-----
-----phm-iqv-----
-----yrs-----rk-wrp-----i
a-----
-----sde|VPGDIVS|gr-----
-----xxqENLVPCDVLLLrg-----

-----rciVDEAMLTGESVPQMKep-

-----XXXXXXXXXXXXXXXXXXXX-

-----HVIFG--GTKVvqhX-----ppq
ka---ttgl-----xxxxxxxaYVLRTGFNTSQGklIrtIlf-----

-----xvkrytannletfifilflIvfaiaaaay
-vwiegtkdpsX-----nryklflecTLILTSV
VPPELPiEISLAVNTSLI-ALakly-----

-----mYCT-EPFRIPFAGKVEVCCFDKTG-----
-----TLTDSLvvX-----xxxxlrdgk-----

-----xxx
pvssipv-----
-----et
hralasc---hslm-----
-----qlddg-----

-----xlvgdple-kamIta-----
-----vdtxxk-xxvfp-----

-----xxxxxxxkihqrfhfasaIk-rmsvxxxexxxt-----

-----xxxxxxa-----
-v-----k-----
-----gap
e-----tIhsmfsqcp-----

-----qfflgtpkxkvp-----

s

>ddiV_V101 XP_629288.1

m

-----xxxxxxxxxxxxxxxxxxxxxhlhlnvi

p-----fiiiyilfylyst

tpiepiinnnnnnngttliksndssiggdisndtiinnnnnstesxxxxxxxxqxx-----

-----xxxxxxxxxxxxxxxxxxxxx

xxx-----

-----ssasstsvnivgngsnvgkixxxxxxxxxxxxxxysiefqkrklvynp

dkkqfekixxx-----

-----xxxxxxx-xxxxrsyetde-----

-----xielaamkyglnrfdipix-----

-----flaly-----

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lwc|-----eeyvfyclf
slfm-----llvfeatvvks-----xx---sn
lnslrnmssk-----

-----ptfxiyv-----
----yrl-----nq-wkq-----i
n-----
---ttellPGDIVSigr-----
xxxxaTSTLPCDMILLsg-----

-----gcvVNEAMLTGESTPHHKes-

-----xxxxxxx-----

-----xxxxxxx
nek-----

-----x-----HILYG-GTTlvqh-----pse
kl---arvs-----xxxxxxxxxaYAYKTGFNTNQGrImrtiwf-----

-----xservtannkesfilfilftfaiaasay
-lfnkgi rennx-----skyklIlncIMVITSV
VPPELPMEISLAVNNSLI-SL iklg-----

-----i YCT-EPFRIPFAGKVDVCCFDKTG
-----TLTTDDLVLx-----xxxxcpkky-----

-----xxxxxxxxxxxxxxxxxxxx
tttdtttxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

-----vi
qfilagc-----hslv-----
-----lidnk-----

-----|vgdpme--mag|ks-----

ila-lns-l-itayglsvlyldg-----vklgdtqatis
gmliavcf-lfistskpl-mk-----lankrpn-----xnlfspym
m-csillqfalxxvciiifivhqsqlrigt---xxx---xxx-----

>cneV_V101 XP_568028.1

-----x-----
-----xxxxxxxxxxxxxxxxxxxx-----

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ypcdssppxxx-----

-----xxxxrgilthp-----

-----xxxxxxxxxxxxxlealkatyglnechipix-----
-----faelf-----

-----xxxxxapffvfq--mfcva
lwcl-----deywyyslf
tafm-----lvvfectvvfq-----xxxxxxxxxxxxxxx--kt
lqefrtmsit-----

-----pyn-vqa-----
-----frd-----gk--wvs-----v
i-----
-----sseLVPGLVSIlr-----
--xpxDSGIPCDLLLLr-----

-----x-x--ciVNEAMLSGESTPLLKes-----

-----xxxxxxxxx-----

-----xxxx
adr-----
-----x-----NVLFS--GTKAlqvxxxxxx--mtt
pd--ggcl-----aVVLRTGFGTQGqlvrtmif-----

-----xtervsantfeafllifgllifaiaasay
-vwikglergm-----vkgklldcVLIITSV
VPPELPMEISLAVNASLV-ALqkya-----

-----iFCT-EPFRIPWAGRVDVCCFDKTG-----
-----TITGEDLVVx-----xxxxvnsad-----

-----xxxxx
pvtesnk-----
-----et
tlalaaa-----halv-----
-----l lddg-----

-----xivgdpme-kttl aa-----
-----ldwkxr-xxxisp-----

-----xxxxxxxxxhirrryqfssalk-rmstxxxxsxxxgk-----

-----xxxxa-----
-v-----k-----
-----gap
e-----tlksmyvqvp-----

-----dwy-eetyrwy-trr-----gsrvLALGVKym-----
-----dvqadkinqihrdxvecklsfAGFLVFHCPLKPDVETLKMLNDss-HRC
VMITGDNPLTAVHVARDEI-----vd-revm-ild
lke-----gtts-----
-----nx-----xxxxxxxx-tnv
ipvnsssep-----
-----dqs lxknyd-----
-----icitgaalk-----

-----qyd-a-lpsvtd-----

likht--yVYA--RVSPAQKEFIITTLr-----
--sl--gy-----ITLMAGDGTNDVGALKAAHIGVALxx
xxxxxxxxxxxxxklerxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx--xxx
xxxxxxxxxxxxx-----xxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxASCAAPFTSKI-SNVSAISniIRQGRCTLVATIQMY-----K
ila-lnc-l-itayslsvqyldg-----ikfgdyqvtit
gmlmsvcf-lcistrakpv-ek-----lskerpl-----xnifnlyv
l-lsvllqfaixxvalvyitglsksledrgx-----

idxxxxfeptlIntaiyllglseq-qvstfvlnfqgrpfre----girenpplyyglgv
savaycgaxxfvpelnr-----wlqlvem-----
-----ttsfr--vk--ltismvldfilc-----
-----waiektc-----

-----kalfadlexvefxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxx-----

q
>athV_V101 NP_197752.1
m-----

-----xxxxxxxxxxxxxxxxxxxxxxxxwrldvw
p-----failytvlttivpsidfsda
cialgglsafhilvllfttwsvdfkcfvqfsvnsidqadackvtxxx-----
-----fsgskevvp|hfrsqmtdsasxxxxxxxxxxxxxqrfiyskelgafsk
|pyptketxxx-----
-----xxxxtghgtea-----
-----xiatatekwgrnvfdypqpx-----
-----fqklm-----
-----xxxxxepffvfq--vfcvg
|wcl-----defwyysvf
tlfm-----lffestmaks-----xx-----kt
|tdlrsvrvd-----
-----sqt--vmv-----
-----yrs-----gk--wvk-----
-----gtdLLPGDVVS|grxxxx-----
-----xxxeDKTVPADMLLLvg-----

saiVNEAILTGESTPQWKvp
 xxxxxxx
 xxxxxx
 rnk
 x HVLFG GTKI lqhxxxxxxx lkt
 pd ggc l aVVLRTGFETSQGklmrt ilf
 xtervtanswesglfilflvvfaviaagy
 vlvkgledptx skykl l lgcSLIITSV
 IPPELPMELISIAVNTSLL ALvrrg
 iFCT EPFRIPFAGKVDLCCFDKTG
 TLTSDDMEx xxxxl snce
 xxx
 dmskvpv
 rt
 leilasc halv
 fvenk
 lvgdple kaalkg
 idwsxxa xxxalp
 xxxxxxxxqimqryhfashlk rmsvxxxx
 xxxxxx f
 v k
 gap
 e tiger lvdvp

-----aqy-ietykry--trq---gsrvLALAYKrl-----
-----xdmnvseardmdr dxvesdltfAGFAVFNCPIRPDSAPVLELKNss-HDL
VMITGDQALTACHVAGQVHI-----vs--npvl-ilg
rsg-----sg-----
-----nx-----xxxxxxx--kei
ipyseke-----
-----ietlxethd-----
-----lcigdsie-----

-----mlq--a-tsavl r-----

vipfv--kVFA--RVAPQQKEL ILTTFk-----
---av--gr-----GTL MCGDGTNDVGALKQAHVGVALxx
xxxxxxxxxxxxxxxxdsk-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxASMASPFTAKh-ASVAPVTdiIRQGRSTLVTTLQMF-----K
ilg-lnc-l-atayvlsvmyldg-----vklgdvqatis
gvltaaff-lfisharpl-qt-----lsaerph-----xsvfsvyl
f-lsligqfavxtflvysvkeaekhmpeexxxx-----

as----fhpnlvntvsymvsmml-qvatfavnymghpfng----sirenpfffyaliag
agfftvi axxlfrdld-----slklvpl-----
-----pqglr----dk--l liwaslmfiic-----
-----yswerll-----

-----xxxxpgkisswkxqrxxxxxxxxxxxx-----

v

>mmuV_V101 NP_573487.1

m

-----XXXXXXXXXXXX

XXXXXXXXXXXX-----XXrrltvl

p-----fagllypawlgaaasgcwggssw-----

-----txx-----

-----XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXX-----

-----dpnkvtfvkvptpnngstelXXXXXXXXXXXXXvlsfefqkikysyd

alekkqflxxx-----

-----XXXXXXXXXXXXrgefeds-----

-----xiraaekkfgsnkaemvvpX-----

-----fself-----

-----xxxxxapffvfq--vfcvg
lwc|-----deywyysvf
tlsm-----lvafeaslvqq-----xx--rn
mseirkmgk-----

-----phm-iqu-----
----yrs-----rk--wrp-----v
a-----
----sddIVPGDIVSigr-----
--xxqENLVPCDVLLRg-----

-----rciVDEAMLTGESVPQMKe-

-----xxxxxxxxxxxxxxxx-----

-----HVIFG--GTKVvqh-----ppq
ka--tsgl-----xxxxxxxxxavFLRTGFNTSQGrllrtilf-----

-----xvkrvtannletfifilflvfaiaaaay
-vwvegtkdpsx-----nryklflecTLILTSV
VPPELPiEISLAVNTSLI-ALakly-----

-----mYCT-EPFRIPFAGKVECCFDKTG-----
-----TLTSDSLVVx-----xxxxlrdgk-----

-----xxx
pvssipi-----
-----et
hralasc--hslm-----
-----qlddg-----

i la-l na-l-laysqsvlyleg-----vkfsdfqatlq
glllagcf-lfirskspl-kt-----lsrerpl-----xnifnlyt
i-ltvm|qfsvxx|slvylyreaqarspekxxxx-----

vdxxxxfeps|vnstvyimamam-qmatfainykgppfme-----slpenkplvws|avs
llaiigllxxsspdfns-----qfg|vdi-----
-----pvefk-----lv--igqv|aldfc|a-----
-----lladvl-----

-----qfflgtpkxrvp-----

s

>rnoV_V101 XP_214310.4

m-----

-----xxxxxxxxxxxx

xxxxxxxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxrr|tv|

p-----fag|lypaw|gaaasgcwgwnsw-----

-----txx-----
-----xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxx-----
-----dpnkvtfvkvvptpnngstelxxxxxxxxxxxxxvlsfefqkikysyd
alekkqflxxx-----

-----xxxxxxxxxxxxxrgfqeds-----

-----xiraaekkfgsnkaemavpx-----
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lwc-----deywyysvf
tism-----lvafeaslvqq-----xx--rn
mseirkmgk-----

-----phm-iqv-----
-----yrs-----rk-wrp-----i
a-----
-----sddIVPGDIVSigr-----
--xxqENLVPCDVLLRg-----

-----rciVDEAMLTGESVPQMKe-----

-----xxxxxxxxxxxxxxxxxxxx-----

-----HVIFG--GTKVvqh-----ppq
ka--tsgl-----xxxxxxaFVLRTGFNTSQGklrtilf-----

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VPELPiEISLAVNTSLI-ALakly-----

-----mYCT-EPFRIPFAGKVECCFDKTG-----
-----TLTSDSLVVx-----xxxxlrdgk-----

-----xxx
pvssipi-----
-----et
hralasc-----hslm-----
-----qlddg-----

-----xlvgdple-kamla-----
-----vdtxxk-xxxvfp-----

-----xxxxxxxxkihqrhfhasalk-rmsvxxxexxxst-----

-----xxxxxxa-----
-v-----k-----
-----gap
e-----tlhsmfsqcp-----

-----pdy-hhihteisre-garvLALGYKel-----
-----xhlthqqarevkrexlecslkfVGFIVVSCPLKADSKAVIREIQNas-HRV
VMITGDNPLTACHVAQELHF-----id-kaht-lil
hpp-----sekg-----
-----qx-----xxxxxxxx-siv
lpltlgs-----
-----pkalxleha-----
-----lcltgdgla-----

-----hlqavd-pqqllh-----

```

liphv-qVFA-RVAPKQKEFVITSLk-----
--el-gy-----VTLMCGDGTNDVGALKHADVGVALxx
xxxxxxxxxxxxxxrdsp-----xxxxxxxx-xxxxxxxxxxx
xxxxxxxxxxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxASIAAPFTSKI-SSIQCIChvIKQGRCTLVTTLQMF-----K
ila-lna-l-ilaysqsvlyleg-----vkfsdfqatlq
gllagcf-lfirskspl-kt-----lsrerpl-----xnifnlyt
i-ltvm|qfsvxx|s|lvly|reaqarspekxxxx-----

```

```

vdxxxxxfeps|vnstvyimamam-qmatfainykgppfme-----s|penkp|vws|avs
lmaimgl|lxsspdfns-----qfg|vdi-----
-----pvefk-----lv--igqv|a|dfg|a-----
-----|ladrv|-----

```

-qfflgtpkxrvp-

S

```
>celV_V101 NP_502165.2
```

m-

xxxxxxxxxxxxxxxxxxxthlyvp
 pftiitaiwtyvwnifgyee
 yxxxxxxxxxxxxxxxxxxxx
 xxxxxxxxxxxxxxx
 dvr iashvcv iptqnnwpelxxxxxxxxxxlwfefqrvhytwe
 esrefqtkxxx
 xxxxxxxxxxxxhgfevee
 xvkdakyl lgdnktemivpx
 flemf
 xxxxxapffvfq--vfcvg
 |wcl|-----edmwyyslf
 tlfm-----lmtfeatlvkq-----xx-----kn
 mseirnmgnk
 tym-inv
 lrg-----kk-wqk-----i
 k
 ieeLVAGDIVSigr
 --xxeEECVPCDLLLLr

x-x-c iVDESMLTGESVPQMKe
 xxxxxxxxxxxxxxxxxxxx
 HVIFG-GTKlvqhxxxxxxxxxvks
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 lwikgsvdetx-skyklflecTLILTSV
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 iFCT-EPFRIPFAGKVDICCFDKTG
 TLTTDNLVVx-xxxxnnqke
 naedlph-xxxx
 es
 lqv|asc-hslv
 rfeed
 lvgdple-kac|sw
 cgwnxxk-xxxvmp
 xxxxxxxxxxxxki fhr yhfssamk-rmtvxxxxqxxxts
 xxxxxxa
 v-k
 gap
 e-vlrnmyadlp

```

-----sdy-detytrl--trq-----gsrvLAMGIRkl-----
-----xetrvgelrddkrexendlafAGFVVISCPLKSDTKTMIREIMDss-HVV
AMITGDNPLTACHVSKVLKF-----tk--kslp-tlv
lde-----padg-----
-----vx-----xxxxxxxx-tie

```

-----h|vhne-htf|re-

```

l i l h v --k V F A --R M A P K Q K E R I I N E L k -----
--s l --g k -----V T L M C G D G T N D V G A L K H A N V G V A L x x
xxxxxxxxxxxxxxxxekaxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxx-----xxxx
xxxxxxxxxxxxxxxxxxxxxAS I A A P F T S K y -T S I A S I C h v I K Q G R C T L V T T L Q M F -----K
i l a -l n a -l -v s a y s l s a l y l d g -----v k f s d t q a t i q
g l l l a a c f -l f i s k s k p l -k t -----l s r q r p m -----x n i f n a y t
l -l t v t l g f i v x x s c l l y i v g l a h e a n t e k x x -----

```

```
vdxxxxftpniltttvyiisma-l-qvctfavnyrgprfme-----slfenkamlysimfs
ggavftlaxxqatdlmi-----qfelvvl-----
-----pearl-----na-----llmcvtadlvic-----
-----yjidrgl-----
```

>ggaV_V101 XP_423767.2

-----f|e|f-----

-----xxxxxapffvfq--vfcvg
lwcl-----deywyysvf
tlsm-----lvafeaslvqq-----xx--rn
mseirkmgk-----

-----pym-iqu-----
-----yrn-----rk-wrp-----i
s-----
-----sdelIPGDIVSigr-----
--xxhENLVPCDVLLRg-----

-----rciVDEAMLTGESVPQMKe-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----HIIFG--GTKVvqh-----ppq
ka--stgl-----xxxxxxaYALRTGFNTSQGklrtilf-----

-----xvkrvtannletfifilflvfavaaasy
-vwiegtkdpsx-----nryklflecTLILTSV
VPPELPiEISLAVNTSLI-ALakly-----

-----vYCT-EPFRIPFAGKVECCFDKTG-----
-----TLTSDHLVVx-----xxxxlrdgk-----

-----xxx
pvsdipi-----
-----et
hraiatic--hslv-----
-----qlddg-----

xlvgdple—kamlma—
—vdwtxxk—xxxvfp—
—xxxxxxxxkqhfrhfaskl—rmsvxxxexxxaa—
—xxxxxxxxa—
—v—k—
—gap—
e—t|hkmlsqcp—
—sny—navhte|—she—garvLALGYKel—
—xhlthqqvremkrexlecd|rfAGF|VVSCPLKTDSSRSVIREIQNas—HHV
VMI TGDNPLTACHVARELHF—lq—reht—lil
qpp—askd—
—sx—xxxxxxxx—siv
fpilpss—
—lrelxqhyd—
—lcvtgegls—
—hlqaln—rqql|r—
l|phi—qVFA—RVVPKQKEFVITTLk—
—sl—gy—VTLMCGDGTNDVGALKHADVGVALxx
xxxxxxxxxxxxxxxxrdgp—xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxx—xxx
xxxxxxxxxxxxxxxxxxASIAAPFTSKI—SSIQCIChvIKQGRCTLVTTLQMF—K

```
ila-lna-l-ilaysqsvlyleg-----vkfsdfqatlq
glllagcf-lfirskspl-kt-----lskerpl-----xnifnlyt
v-ltvllqflvxxlslylyhgaqvrsgskxxxx-----
```

S

[illegible]

fvp|ylsafy|lwinvtggqendttnndvitadxxxxxxxxxtxx

-----xxxxxxxxxxxxxxxxxxxxxxx

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edrktrfraxx

-----xxxxxxxxxxrgletee

-----xikratqtygnnememvvp

-----fhelf

-----xxxxxapffvfq--vfsvg
lwcm-----ddwyyslf
tlfm-----liafectivkq-----xx--rn
mseirkmgkn

-----pyl-ia

-----frq-----nk-wrh-----l
g-----
-----sdeLLPGDLVSitr
-----xxnDNIVPCDLVILr

-----x-x--ciVDESMLTGESVPLMKes

-----FVLFG-GTKVqhxxxxxxx-lra
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-----xanratenvetfafialmvfavaaasy
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IPPDLP|EITLAVNTSLI-QLtklf

-----vFCT-EPFRIPFAGKVQICCFDKTG-----
-----TLTTDNLMVx-----xxxxlapng-----

-----xxx
piekaeg-----
-----nt
vqvlacc-----hsla-----
-----liddg-----

-----lvgdple-katl原因-----
-----vdwtxxk-xxxvip-----

-----xxxxxxxxkiiqryhfssalk-rmsvxxxxlxxxsn-----

-----xxxxxxxa-----
-v-----k-----
-----gap
e-----viqkmlrevp-----

-----ady-ekvyley-arr-----garvLALGIKdl-----
-----xtlgaqrvmkrexvecdltfAGFLII SCPMKPDSKSVIKELIQss-HKV
VMITGDSPLTACHVARELRF-----tr-kkli-ilt
ppe-----edrk-----
-----nx-----xxxxxxxxxxsye
ldtkpgsk-----
-----xlshlxathd-----
-----lcitgeglq-----

-----ylqqnq-pqymrq-----

l l p q i - t V C A - - R F A P K Q K E L V I T Q L k - - - - -
 - - q l - g y - - - - - C T L M C G D G T N D V G A L K H A N V G V S L x x
 x x x x x x x x x x x x q q a a - - - - - x
 x x x x x x x x x x x x - - - - - x
 x x x x x x x x x x x x x x x x A S I A A P F T S K s - S S I M C V N h i I K Q G R C T L V T T L Q M F - - - - - K
 i l a - l n a - l - i q a y c q s v l y i d g - - - - - i k f s d t q a t m q
 g i f i a a c f - l f i t r a k p l - k t - - - - - l s k v a p l - - - - - x n i f n f y t
 i - s t i l s q f a v x x g t l y l y l t s q a n i l a p p r x x x x x x x x x x - - - - -

```

aexxxxypnivsstvyiiclsl-qvatiavnykgyfme-----slrsnrmlmyaigas
aalvillsxlapelte-----ffeiidf-----
-----ptdfr-----kt-----llglvlldivga-----
-----fllldric-----

```

```
-sf|fgetrxkskxxx-
```

C

>tanV_V101 XP_955061.1

m-

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxpesglr
nxxxxxxxxxxxxxxxxxxxxxxxxxtlykysnqalyiklspvfllstlavff
rpefltklr|swsec|ltevegrhelss|rldinlpfinklnlxxxxxxxxixxxx
xxx--

-----nrtnkl||plyrtgfiyyihdxxxxxxxxxxepvehfdevqpqi
lnwrgl|sxxx-

-----xxxxxcgfepnl-

-----nvcdygygpndyeiprcx-
---xxxxlleaf-

-----xapfflfq-vtstl
lwif-----ddylysli
sifs-----mvlievqmvyk-----xx----ie
ynrin smkl p-

-----pfniyv-
---yrd-----hk-wqv-----t
|-

---tnLYPGDIILIttxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-
---eIIICPCDCLILEg-

-----eviVDESILTGESIPQFKts-----
-----xxxxxx
nqr-----x-----STIFS-GTTI i l txxxxxxxxxxxxtss
tstxxxagaxxxxxxxxxxxxxxxxxxxxxxxxxcLVIRTFGESYQGrlvhsiln-----
-----xxpnkvvgснаqgymflll lvlfavaavvv
-vvrnsnyk-----svkklllvSRILVS
IPPEFPVTISMAVTIGLI-QLrkkg-----
-----i YCT-EPNRLPLAANIDVI AFDKTG-----
-----TLTQDQMYLx-----xxxxsste-----

-----plxxxxxxxxx-----xxxxxxxxx-----ys
klviggc-----hslt-----
-----nvnga-----

-----itgdpmе-kisfth-----
-----fnqxxr-xxxniv-----

-xxxx-xxxxxxxki lkrwrftselg-rmstxxx-----

-----xxxxxxxxxxxxxxxxxxxxxxxxx|-----
-t-----k-----gsp
e-----kvkml r lvp-----

```

-----syf-eevchdl--tik-----glrvLCLAYKrI-----
-----xdipinalitidrnrxvekdl efCGFLALEAPIKNSSKLCMKRLKN---FKK
IMITGDNILTACYVTQQINM-----vnxxstii xpin
ctsxXXXXXXXXXXXXXXXXXXXXXnsIf--XXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXsXXXXXXXXXXXXXXXXXXXXXXXXXXXX--xnsy
kkfletcpfXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----xxsgvsxskvsXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
x--XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXlsitgnilq-----

```

```
-----|||nsxtptnttxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xx-----
```

i i nnc—sVFA—RMSPQQKEF I I KCYk-----
---I n—nk-----T I AMCGDGTND I SALKQAD I G I SLxx
xxxxxxxxxxxxxxx | dne-----

-----xxxxxxxASIASPFTYHg-SDVNCVFnlIKSGRCSLYNLFMLY-----K
lmg-ins-l-italgmsvlaldg-----vnfsdaqttly
svlytylv-lslnkskci-dv-----tcdkpe-x---sifspcn
f-mslvlqilvxyfliyvnmgkmyrsad-----xxxxxxx
xxx-----

pn-----vvntlllyvwyainlns-fvsnyidy p ymd-----ti vnnkflfkpv lfs
yftmllfixxlvkplns-----ffslvpi-----
-----nhtlk-----lk--itavvfl d f i l t-----
-----fvyskl i-----

-----nffvysf-----

d

>dmeV_V201 NP_726536.2

m

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxmkvcgy

r-----xxxxxxgfcwacifltggllrlvlhwwrhlylya

tcsqcsleeaeqvlv-tedyqgkhkmyhvkqiqvltssnlktllexxxxxxtxx---

-----xxxxxxxxxxxxxxxxxxxxxxxx-----

-----qfkkcssirifrcqqlvyawn-----nntnrfqringldl

nipcsyyhxxx-----

-----glpvhe-----

-----qisrrivfgdneitvplr-----

-xxxxxxflevl-----

-----npfyvfq--lfsvi
lwft-----ydyyyyacv
iilm-----svfgitvsvlq-----xx-----kn
qdv|qktvyn-----

-----tgn-awv-----
---xdhk-----gl--ske-----l
p-----
---tra|VPGD|IElps-----
---sGCTLHCDA|Llsg-----

-----nciLDESMLTGESVPVTktp-

-----xxxxxx-----

-----xxxxxx
eha-----
-----x-----HTLFC--GTKV|qt-----ryi
gs---kkvl-----aFVINTGNITAKGelirsily-----

-----x--ppvdykfeqdsykfiqflaiiacvgfiy
-tlvtkilrgt-----dpvkiavesLDLITIV
VPPALPAAmTVGRFYAQK-RLktse-----

-----iFCI-SPRSINVAGSINCCCFDKTG-----
-----TLTEDGLDM-----wgvvpX-----
-----x-xxx-----xxx-----

ip--lksxxxxx-----
-----xx-----hf
lfgmvtc---hsit-----
-----iIngr-----

[illegible]

lvgfftllisflvrntrvgkhlfvirvpletctivkirdlnkstxxxxxxxlxx-----
-----xxxxxxxxxxxxxxxxxxxxx-----

-----ipfekykvakncyvpvvtaesxxxxxxxxxxxxnnescfldssnr l
nsylmstnxxx-----

-----xxxggltese-----

-----sarrsedigpneipiekl-----
-xxxxxyrevs-----
-----dpvffmqxxl t t k s
iywr-----syitapiw
gtttxx-----tiykkvkiiyd-----xx-----nd
lynlttssnq-----

-----kyv-----
---xxlre-----nv--tkn-----v
m-----
---trdLAVGDIVRVen-----
---DWEVPSDMI MLr-----

-----x-x---aiVDESSITGESIPLKKrk-----

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX-----
-----XXXXXX
sin-----
-----x-----NLLKS--GTKVisvxx-----nqe
ts---vsav-----aVVIATGVYTTKGkqikgvl f-----

-----pnqfrlk ydtq l p l v f l l t f i a l f c s
-yyqirflg-----wnmisifyslGTLSQV
VPVWTSTl i S l S Q S R A C Q - R L s k s e x-----

-----i YCI-APSRIAVCGKLRVMCFDKTG-----
-----TLTNNKL IF-----ngsky-----
-----XXXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXXX-----
-----v i
slavatic-----hsvw-----
-----xxxxtsekf-----

-----xxxvdksmfexxgcvvdqxxxxxx-x-----
-----nrry--i--xxxqne-----xx-----

-----xxevinsfdfdyqkk-lssvxxxex-ve-----

-----x-----xx-----x-----
-----xx-x-----f-----
-v-----k-----
-----gaf
e-----nlsvccnnel-----

-----enl-svlsnne-ssn-gsyvLGLAYKvl-xxx-----
-----xxtdrnl-----mesnlqmISLLIFNNQVRPESKEVIQTLNEam-VRT
VILTGDNI PASKYVARKCNM-----iqxxnsti-----

-----xxxxxxqxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxdee
klffseefsx-----

-----ismtgdvfd-----

-----yiennwxelary-----

-----XX
XX
XX
XX
XXivagf
k-----xxxxxxaaytiiclgltlgigwllfrwlpwhvkl
lgqpcplrecewvvi enqwgemaildvqs rpygrslstvf gpgkxxxxxxxxd-----

-----sdpil telrvvdryvrfyf q-----plrdkfmlcygwkd
pnwtdvhsxxx-----

-----gidsee-----

-----kshrdlvfgtnlidieqk-----
-xxxxxxvdevf-----
-----hpfyv fq--iasli
lws m-----deyyyyata
iflm-----sfgsitttlie-----xx-----at
mrrlreisrf-----

-----ecd-vrv-----
-----l rn-----gf-wry-----v
a-----
-----sgdLVP GDIYEVsdx-----
-----nLTQFPADSLLLgg-----

-----dcivNESMLTGESVPVSKip-----

-----XXXXXXXXXXXXXXXXXXXXX-----

-----HFLFC--GTKIirax-----rpv
eg---gege-----xxxxaMVVRTGFNTTKGslvrsmIf-----

-----x--kpsgfkfyrdsfryisvmacvamvgfia
-sfinfvrlel-----awhliivraLDLITIV
VPPALPATIQIGTNFALS-RLkkkq-----

-----iYCI-SPQRVNVGGKIDIMCFDKTG-----
-----TLTEEGLDV-----lgvrvx-----
-----xxxxx-----xxxx-----

-----xxxxx-----xxxx
dlqgdsrxxxxx-----
-----xxx-----a-
lftmatc---hslr-----
-----svdge-----

-----lvgdpld--lkmfef-----
-----trws--f--xxxeqg-----xxx-----
-----xxxxxxxx-----xxxxxxxx-----xx-----xxxxxxxxxxxxxxxxxxxxx-----
-----gvlksfefvsqrl-rasv---i---vr-----

-----x-----x--x--xx--x-----
-----xx--x-----y-----
-v-----k-----
-----gap
e-----cmkdicrpesxx-----

vdy-de llsyy-thk-gyrvlGCATKhi-x-
-x-xxxvkaqkmkre-q-aesdlefVGFIIIFENCLKPTTA AVLEELVKsn-lGA
VMVTGDNILTAISVARESNL-idxxahcf-ipr
fih-gnstxxxxxxxxxxxx-
-xxxxxxxxxt-xmpl
ppppqsdasx-
-xxdisnxrnys-iavsgdifr-
-wvvdya xpevlhr-
mlvcg-kVFA-RMSPDEKHELVEKLq-
--si-dy-CAGFCGDGANDCGALKAADVGISL-
seae
ASVAAPFTSRv-FDIRCVPevIREGRAALVTSFSCF-K
yms-lys-a-iqftsvsflyasa-snl gdfqflfi
dlalilpixifmswagpy-pq-lcrkrpt-x-dlvsrkv
l-tpllgmci-ciaiqavvfiavrkqsw-xxx-
-xxxxxx-
es-nitnsentslfliscfe-yilagvvinagrprfq-gmlknwpfvatisit
llatlymv-lqparpl-tdlmelt-
xxaldfk-fy-iivmgfyvylia-
ytaehya-
fgriarlixrvnxxxxxxx-

-----XXXXXXXXXXXX-----

a

>tpaV_V201 XP_766443.1

m-----

-----xxxfvcnelcipmvssveywdsrakpflfsw
lvgfftllisflvrntrvgkhlfvirvpletctivkvrdfnksstxxxxxxxx|xx-----
-----XXXXXXXXXXXXXXXXXXXX-----

-----ipfekykvakycyvpvveadsxxxxxxxxxxxxdseescf|dssnr l
nsylmstnxxx-----

-----xxxxggltese-----

-----sarrsedigpneipiek|-----
-----xxxxxyrevs-----

-----dpvffmqxxl t t k s
iywr-----syitapiw
gittxx-----tiykkvkiiyd-----xx-----nd
lynlttssnq-----

-----kyv-----
--xxlre-----nv--tkn-----v
m-----
---srdLAVGDIVRVen-----
---DWEVPSDMI MLr-----

-----x-x--aiVDESSITGESIPLKKrk-

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXX-----
-----XXXXXX
ine-----
-----NLLKS--GTKV isvxx-----nqe
ts---vsav-----aVVIATGVYTTKGkqikgvlf-----

-----pnqfrlkydtqplvflltfiyalfcs
-yyqirflg-----wnmisifysIGTMSQV
VPVWTSTIiSISQSRACQ-RLsksex-----

-----iYCI-APSR IAVCGKLRVMCFDKTG-----
-----TLTNNKLIF-----ngsky-----
-----XXXXXXXXXXXXXXXXXXXX-

-----XXXXXXXXXXXXXXXXXXXX-----
-----vi
slavatic---hsvw-----
-----xxxtseqf-----

xxxxvdksmfdxxgcvvdqxxxxxx-x
nrrf-i-xxxene-xx
ve
x-xx-x
xx-x-f
-v-k
-gaf
e-nlsvcnnes
enl-silsnne-ssn-gsyvLGLAYKll-xxx
-xxtdrnl-mesnlqmVSLLI FNNQVRPESKEVIQTLNEam-VRT
VILTDGNIPASQYVARKCNM-iqxxqdst
-xxde
klffseeysx
-ismtgdvfd
-fiennwxel sky
-xxxxxxxxxxxxxxxxxxxx
flmki-rIFA-RLNPQKVRVINSFk
-rl-gi-ITGMCGDGTNDCLALQASHAGISL
-tkgv
-SSMVSPFSSMt-NKLESVlyILREGGSLVTCLACF-K

fml-lfgxm-iafvkvtlfrlcr-----gvmpewgylfi
enaimlllxytmalsrps-ek-----lrispt-----xsligplt
l-lsvgimfiixxafllllfelyhrlgiptxxxxxxxx-----

paxxxlstdnfeaptvcfwlcyq-vvntalvfsfggvfre----sihrntgfstvwlf
nsfltylt--lskpnkl-----tclfrinxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxpknfk----ia--flglnfvcvin-----
-----cliaksf-----

-----fsnsflxrvrxxxxxxxxxxxx-----

i

>hsaV_V201 NP_071372.1

m-----

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxvrlsgy

c-----xxxxxi gyhvvvmmagi plllfrwkp lwgvr l

rlrpnclahaetlvieirdkedsswqlftvqvqteaigegslepxxxxxxxxxxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xx-----
-----svgqkrvlryylfqgryiwi-----etqqafyqvslldh
grscddvhxxx-----

-----hglslqd-----

-----qmrkaiygpnvisipvk-----
-xxxxxxvdeal-----
-----npyygfq--afsia
lwla-----dhyywyalc
ifli-----ssisiclslyk-----xx-----kq
sqtlrmdmvl-----

-----smr--vcv-----
---xrbg-----ge--eev-----v
d-----
---sseLVPGDCLVLpq-----
---eGGLMPCDAALVag-----

-----ecmVNESSLTGESIPVLKta-----

-----xxxxx-----

-----xxxxxx
thr-----
-----x-----HTLFC--GTLllqa-----ray
vg---phvl-----aVVRTGTGFCTAKGglvssilh-----

-----x--rpinkfykhsmkfvaalsvlallgtiy
-sifilyrnrv-----plneiviraLDLVTVV
VPPALPAAmTVCTLYAQS-RLrrqg-----

-----iFCI-HPLRINLGGKLQLVCFDKTG-----
-----TLTEDGLDV-----mgvvp-----
-----x-xxx-----xxx-----

pl--vpexxxx-----
-----xx-----pl
lralatc-----hals-----
-----rlqdt-----

-----pvgdpmd--lkmves-----
-----tgwv--l-----eee-----xx-----
-----xxxxxxx-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----svlhrfpfssalq-rmsv---v---va-----

-----x-----x---x--xx---x-----
-----xx-x-----y-----
-v-----k-----
-----gsp
e-----lvaglcnpetxx-----

-----tdf-aqmlqsy--taa---gyrvVALASKpl-----
-----xxvpsleaaqqltrdxvegdlslGLLLVMRNLLKPQTTPVIQALRRtr-IRA
VMVTGDNLQTAVTVARGCGM-----vaxxehli-ivh
ath-----pergxx-xxx-----
-----xxxxxxxxxv-----xgvk
dpdqaasytx-----
-----xxdprsx--h-----
-----lalsgptfg-----

-----iivkhf-pklpk-----

m-----

n-----xxxxxxai v s l g v i c s g g f l l l l y w m p e w r v k a
t c v r a a i k d c e v v l l r t t d e f k m w f c a k i r v l s l e t - y p v s s p k s x x x x x x h x x -----
-----xxxxxxxxxxxxxxxxx-----
-----sqtesqqiryfthhsvkyfw-----dtihnfdfllkgld
gvsctsiy-----
-----xxxagltkgn-----
-----hayrkllgyvneiavkvp-----
-xxxxxxikevl-----
-----npfyifq--lfsvi
lwst-----deyyyyala
ivvm-----sivsivsslys-----xx-----kq
yvmlhdmvat-----
-----hst-vrv-----
-xxxrvn-----ee-ieee-----i
f-----stdLVPGDVMVlpl-----
---nGTIMPCDAVLIng-----

-----tcivNESMLTGESVPVTktn-----

-----XXXXXXXXXXXX-----

-----XXXXXX
thk-----
-----x-----HTLFC--GTTViqt-----rfy
tg---elvk-----aIVVRTGFSTSKGqlvrsily-----

-----x--kptdfklyrdaylfllclvavagigfiy
-tiinsilnev-----qvgviiiesLDIIITIT
VPPALPAAmTAGIVYAQR-RLkkig-----

-----iFCI--SPQRINICGQLNLVCFDKTG-----
-----TLTEDGLDL-----wgiqr-----
-----x-xxx-----xxx-----

speenvcxxxxx-----
-----xx-----qf
vacmatc---hslt-----
-----kiegv-----

-----lsgdpld--lkmfea-----
-----igwi--l---eea-----xx-----
-----xxxxxxx-----xx-----
-----givrqpfsalq-rmsv---v---ar-----

-----x-----x--x--xx---x-----
-----xx--x-----y-----
-m-----k-----
-----gap
e-----aiaglcckpetxx-----

A series of horizontal lines for handwriting practice, consisting of three sets of three lines each (top solid, middle dashed, bottom solid).

This image shows a handwriting practice sheet. At the top left, a dashed lowercase letter 'm' is positioned on the top line of a set of three horizontal lines (top, middle dashed, and bottom). Below this, there are ten identical sets of horizontal lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line, providing space for practicing the letter 'm' and other characters.

```

X-XXXXXXXXXXXXXXXXX-----
-----me ifgy
r-----xxxxxs|clags ifsfgilplvfywrpawhvw
hcvpcs|qeadtv|lrrttdefqiyswkkviwiylsalnsafgltpxxxxxxxexx-----
-----xxxx-----
-----

```

-----irkpdlkvrcikvqkiryvwn-----ylegqfqkigsled
wlssakih-----

-----xxxxsgltree-----

```
-----qeirrligpntidvevt-----
-xxxxxxikevl-----
```

-----npfyifq--lfsvc
 lwfs-----edykeyafa
 iim-----siisisltvyd-----xx-----eq
 svklhhlves-----

 -----hns-itv-----x-----
 ---xxgrk-----ag-vqe-----l
 e-----
 ---srVLVPGDLLlItg-----
 ---nKVLMPCDAVLleg-----

 -----scvVDEGMLTGESIPVTktp-

 -----xxxxxxxx-----

 -----xxxxxx
 dyk-----
 -----x-----HVLFC--GTEViqa-----kaa
 cs---gtvr-----aVVLQTFNTAKGdlvrsily-----

 -----x--kpvnfqlrdaifllclvgtatigmiy
 -tlcvyvlsg-----ppeeivrkaLDVITIA
 VPPALPAAITTGIIYAQR-RLkkr-----

 -----iFCI-SPQRINVCGQLNLVCFDKTG-----
 -----TLTRDGLDL-----wgvvs-----
 -----x-xxx-----xxx-----

 evhsfasxxxx-----
 -----xx-----pl
 caamasc---hsl i-----
 -----ldgt-----

-----iqgdpld--lkmfea-----
-----ttwe-m-afs-----xx-----
-----xxxxxxx-----xxxxxxx-----xxxx-xxxxx-----xx-----
-----ailhqpfssalq-rmtv---i---vq-----
-----x-----x-x-xx-x-----
-----x-x-----f-----
-m-----k-----gap
e-----rvasfcqpetch-----
-----tsf-vselqiy-ttq-gfrvlALAYKkl-----
-----endhattltrexvesdlifLGLLIENRLKEETKPVLEELISar-IRT
VMITGDNLTQAITVARKSGM-----vsxxqkvi-lie
ane-----ttgsxx-xxxxx-----
-----xxxxxxxx-m-----xgnq
dnyinirdex-----
-----xxkgre-gsyh-----faltgksfh-----
-----visqhfs-sllpk-----

iling-tIFA-RMSPGQKSSLVEEFq-----
-kl-dy-----FVGMC GDGANDCGALKMAHVGISL-----
-----seqe-----
-----ASVASPFTSKt-PNIECVPhIIKEGRAALVTSCMF-----K

ncipcp|qeadtv|lrrttdefqymrkkvfclylstlkfpvskkwwxxxxxxxxhxx-----
-----xxxx-----

-----likpelklrmevqkiryvwn-----dlekrfqkvglled
snscsdih-----

-----xxxxlgl tsee-----

-----qevrrlvcpnaieveiq-----
-xxxxxxvkqvl-----
-----npfyvfq--aftlt
lwls-----qgyieysva
iiil-----tvisivlsvyd-----xx-----qq
svklhnlved-----

-----hnk-vqv-----x-----
--xxvkd-----kg--lee-----l
e-----
---srILVPGDILILpg-----
---KFSLPCDAVLIdg-----

-----scvVNEGMLTGESIPVTKtp-----

-----xxxxxxxx-----

-----xxxxxx-----
dyr-----
-----x-----HVLFC--GTEViqv-----kps
gq--gpvr-----aVVLQTYNTAKGdlvrsily-----

-----x--rpInfklysdafkfivflac|gvmgffy
-algvymyhg-----ppkdtvtmaLILLTVT
VPPVLPAAITIGNVYAQK-RLkkkk-----

-----iFCI-SPQRINMCGQINLVCFDKTG-----
-----TLTEDGLDL-----wgtvp-----
-----x-xxx-----xxx-----

eahsfasxxxx-----
-----xx-----pl
caamasc-----hsl i-----
-----l lngt-----

-----iqgdpld--lkmfeg-----
-----tawk-m-----edc-----xx-----
-----xxxxxxxx-----xx-xxxxxx-----xxxx-xxxxxx-----xx-----
-----itlcqfpfssslq-rmsv----i---aq-----

-----x-----x---x--xx---x-----
-----xx-x-----y-----
-m-----k-----
-----gap
e-----mvarfcrsetxx-----

-----knf-pqelrsy--tvq---gfrvIALAHKtl-----
-----xmgnlsevehlarexveseltfLGLLIMENRLKKETKLVLKELSEar-IRT
VMITGDNLQTAITVAKNSEM-----ipxxsqvi-ive
ade-----peefxx-xxxxx-----
-----xxxxxxxx-p-----gkk
eiyghtgnsx-----
-----xxrgegxcyh-----
-----famsgksyq-----

-----vifqhf-nsllpk-----

i l v n g — t V F A — R M S P G Q K S S L I E E F q —————
 — k l — n y ————— Y V G M C G D G A N D C G A L K A A H A G I S L —
 ————— sege —————

-----|qnhe|wl-|ikxxxxxxx-----

>ddiV_V201 XP_638373.1

-----itsg
gneeigenelep|lvnngsgd|sy|kkfekqenidengddm|lvxxxxxxxxixxxxx
xxxx-----xx
xxxxxxx-----
-----veenekyiiyrf-----xxxxxxeklqeyektklinq
yekidflrxxx-----
-----nglsenn-----

-----lqrmqrfgsneinfpvkx-----
---xxxxlmeev-----
-----xhpffifq---iysvc
lwia-----eeyyyyaga
ifii-----atvsavlsire-----xx-----gn
llslqkiahf-----

---xxxxxxvrnxgri-----
-----et-----i
p-----
---stdLAPGDIIELk-----
---qDFIMPCDAILLsg-----

-----qaiLNEsMLTGESIPVnKys-

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-

-----XXXXXX
kek-----
-----x-----SLVFG-GTVVvklxx-----sps
tn---dril-----cMVRDTSFQTTKGklilsily-----

-----xkkshfkffmeslkfvglcflavigfci
-svwklnsIgi-----dfgtiairaLDLITIV
VPPALPMAmTVGTGFGLS-RLrktk-----

-----vFCI-SPPRLNMAGKIQVFCFDKTG-----
-----TLTEGLDL-----lgiisx-----

-----xxx
tvkhvdnxxxxx-----XXXXXXXXXXXX
XXXXXXXXXXXX-----mf
rvImasc---hslt-----
-----vings-----

-----vsgdple--ikifes-----
-----tnst--i--xx-----
-----XXXXXXXX-----XXXXXXXXXXXXXXXX-XX-----
-----sylenfdfqsklq-rmsv---i---vq-----

-----x-----x---x--xx---x-----
-----xx--x-----|-----
-v-----k-----
-----gsp
e-----mvkg|cfqhtxx-----

-----ndy-dsq|amy--tek---gyrvLACAYRsw-----
-----xptv|fpkrel|rkxsesn|hflGF|IMENRVK PQSPP|IQRLQSan-IRT
VMVTGDNGLTATSVAKQCG|-----ikxxt|lf-mg-
liq-----psssx-x-----
-----xxx-----xxxxxxxxxxxxxg-----xxxxhkl
dptt|l|dex-----
-----xrdyn-----
-----livsgpvfk-----

-----qiynhyxatgspr-----

-----xxx
mlrrg--iVYA--RMTPDEKQSL|EELq-----
---ri--gl-----YVGMCGDGANDCGALKAAHVGI SL--
-----sese-----

-----ASIAAPFTSTi-TDISCCPn|IKEGRASLAVSFKLF-----Q
fmg-iysxixftsvifcy-----xxxsv|gnwqylyq
divifp|xifl|gmtepcxk-----lsvkrps-----xrlis|nm
i-gsllshitvxxvfl|lvfhlvqskswfdx-----

plxxxxnifnyitts|fifgcfq-ysim|fvfsfgkpflk-----aiytnryl|lvyivt
lianliilxgfe|klyn-----flqlrvi-----
-----pvsr-----st--mfgmi|gn|van-----
-----clielsf-----

-----yfyksrskxk|xxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxx-----

f

>ddiV_V202_XP_639952.1

m

-----XXXXXXXXXXXXX

XX

XXankkIk

sXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXtfrldsklpkpttsIkniIkssltnsrn

mennnnkieieeeeeeeekdlsylkkvekqenieenggedmllvxxxxxxxxnxxxxx

xxxx-----XX

XXXXXXXXXXXXXXXXXXXX-----

-----nqytesyiyrf-----xxxxxeki qeyektklvnq

yekiellrxxx-----

-----nglskes-----

-----lkkIkqrfgeneinfpvkx-----

---xxxxlmeev-----

-----xhpffifq--iysvc
lwia-----eeyyyaaa
ifli-----atvsaiislr-----xx-----gn
llslqkishf-----

--xxxxxlrnxgei-----
-----et-----i
s-----
----steLVPGDIIElr-----
----qDFIMPCDVILLsg-----

-----qaiLNEsMLTGESIPVnKys-

-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-

-----xxxxxx
kek-----
-----x-----SLIYG--GTVVvklxx-----sts
tn--dkif-----gMVRDTSFQTTKGklilsily-----

-----xkkshfkffmeslkfvglcvlafagfci
-svwr|ktlgv-----tnhiialraLDLITIV
VPPALPMAmTVGTGFGLS-RLrksk-----

-----iFCI-SPPRLNMAGKIQVFCFDKTG-----
-----TLTEEGDL-----lgisxxxxxxxxxxxxxxxxxxxx
xx-xxxx-

-----xxxxx--xxxx
s|pnsptxx
xxxxxxxxxx-----mf
rllmstc----hslt-----
-----vings-----

-----vsgdple--ikifes-----
-----tnst--i--xx-----
-----xxxxxxx-----xxxxxxxxxxxxxxxx-----
-----sylenfdfqsklq-rmsv----i--vq-----

-----x-----x--x--xx--x-----
-----xx-x-----|-----
-v-----k-----
-----gsp
e-----miknlcipqtx-----

-----kdy-dsq lai y--tek---gyrvLACAYRkw-----
-----xptflfpkrdilrkxsesnlefLGF I I MENRIKPQSPP I I KKLQK an-IRT
VMVTGDNGLTATSVAKQCGI-----ikxxsilf-mg-
liq-----psstxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxg-----xxxhkl
dpntlllddx-----
-----xrdyn-----
-----livtgpvfk-----

-----qiyhhyxatgstr-----

-----xxx
mlrrg--vVYA--RMTPEKQTLIEELe-----
---ri-gl-----YVGMCGDGANDCGALKAAHVGI SL--
-----sese-----

-----ASIAAPFTSTi-TDISCVPt I I REGRASLAVSFKLF-----Q

rfkecklndanyvyvkakdkkyelsqvkhl igkklde-----

-----fsesekdkyiefkftrlfyn-----vekdIfirpisntd
yhrskinexxx-----

-----tglsmnk-----

-----yqegrdlfgpnl isvplk-----

-xxxxxxldeil-----

-----hpffifq--iysii

lwct-----edyyvyaga

ilfi-----alvtaitltre-----xx-----nn

llrlneiatty-----

-----rcd-vtv-----

-----lrd-----gk--lqv-----v

s-----

---setLVPGDIIElq-----

---kSLVLPcdfCLLt-----

-----tviLNESMLTGESIPVTkys-----

-----XXXXXXXXXXXXXXXXX-----

-----x-----CAMSG--GTKVvktx-----ake

kd---akif-----aMVTNTSWLTTKGglvlsmly-----

-----xkeshfkffeqslkflgvlcfialigfgv

-svwrlikage-----qlsevvtkalDLITIV

VPPALPMAqSVGTGFSIV-RLkank-----


```
-----iFCI-SPPRVNMAGKVEVYCFDKTG-----  
-----TLTEDGLDL-----fgvlpX-----  
-----XXXXXX-----XXX-----  
  
gfgtvikxxxxx-----  
-----xxx-----pl  
fltmac-----htla-----  
-----hideq-----  
  
-----vsqdple-----ekifta-----  
-----tnak--l--xxxgef-----xxx-----  
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----  
-----alverfefqsallq-rmsv---v---ir-----  
  
-----x-----XXXXXXXXXXXXX-----x-----  
-----xx-x-----i-----  
-v-----k-----gsp  
e-----mikklsnptsxx-----  
  
-----sdf-ehvlsty-tkk-----gyrvLGCGYKew-----  
-----xxsdSIGtkdeirsxverdImfLGFII MENKIKPETAGALKVLKDan-IRI  
IMVTGDNVLTAVSVSRECGLE-----vtxxktif-----  
-----ssqlXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
XXXXXXXXXXXXXXXXXXXXX-----  
  
-----lavtgdvwk-----  
  
-----yydqfxangqpt-----
```



```
-----XXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXrWgrd
sXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXpqpvpqrpsttalgriasfigltrhdt
edeeaalvhsvdelrrrssrsrsrassgsrsyarspspspsXXXXXXXXdXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXvetpygdhvipihivpypypXXXXXXXXXXXXsatsangyfglss
stpaqplhxxx-----
```

-----xxxxggvggak-----

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXrqr l v l m g e n i d i a s k-----
-xxxxxxvdevl-----
```

```

-----hpfyvfq--iasii
lws|-----ddyyyyafa
iali-----sitsimstlie-----xx-----rt
iermremsrf-----

```

-----hcd-ikv-----
-----lid-----ge-wvm-----k
d-----
-----cseLVPGDIFDSsd-----
-----xnLSVFPCDALLsg-----

-----daiVNESMLTGESVPVSKip-----

-----XXXXXXXXXXXXXXXXXXXX-----

-----XXXXXXXX-----
dla-----
-----x-----HYLFS---GTKIirvx-----aga
kp---vwap-----XXXXXXXXXaMVRTRTGFNTTKGalvrsmIf-----

-----x---kpmgfkfyrdsmnfigvlaiiagfgfai
-savqfvrigi-----hwhtimIraLDLITIV
VPPALPATITIGTTFAID-RLrksg-----

-----iFCI-SPNRVNI GGKINVCFDKTG-----
-----TLTEDGLDV-----lgartx-----
-----XXXXX-----XXX-----

-----XXXX-----
diadvpiXXXX-----
-----xxx-----pl
lyalatc---halk-----
-----lidge-----

-----iigdpId--ikmfey-----
-----tgwt--l--xx-----x-----
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX--XXXX--XXXXXXXXXXXXXXXXXXXX--
-----gvirtfdfvsaIr-rmsv---i---vk-----

-----x-----x---x--xx---x-----
-----xx--x-----y-----
-v-----k-----
-----gap-----
e-----vmpei cdpssxx-----

-----hdy-ddmlsy--trn---gfrvIAIAGKsi-----
xx-----xxxlraqrmrrdv-----aesdlqfLGFIVFENKLKPGTAPNIHTLRAah-LAC
RMVTGDNVRTAISVARECGL-----vsxxasvy-ipt
fip-----gtgvxxxxxxxxxxxxx-----
-----xxxxxxxxxt-----xkpl
tn-qvgvax-----
-----xxaeaexhdyq-----
-----laltgdvfr-----

-----wmleyaxfetmer-----

mIvkg-vIFA-RMSPDEKAELVERLq-----
--sl-gy-----TVAFCGDGANDCGALKAADVGVS�-----
-----seae-----

-----ASVAAPFTSQi-PDISCMVe i IKEGRAALVTSFSCF-----K
yma-lys-m-iqfmtvtlllysfa-----sslgdfqflyi
dfliiipixvtmgrtlpy-pk-----ihprpt-x-slvsrkv
l-isigqili-naaiqvfvfwvrkqpW-----xxx-xx
xxx-----x-----
kl-etnfensalflvscfq-yilvagvfsvgppyrk-----plytnpslvictvl
tsfsayil-lspaasi-----aaildit-----
-----xxkftfr-----lq-llavaavnilas-----
-----faferfa-----

-----erpi srmixfakxxxxxxxx-----

-----xxx-----xxxxxxx-----
-----xx-----

i
>pfaV_V201 XP_001351598.1
m-----

-----xxxxxxxxxxxxxxxx
xx
xxxxxxxxxxxxxxxxxxxxxxxx-----

-----xxxxxxxx
xx
xx
xxs fhkks
i-----xxxxxxkrlsrnslytkkvlrdqennlgyydaq
neinkmnsidhiynidslnvidqgndknydneekeinckypfnrnxnxxxxxxdxx-----
-----xxxxxxxxxxxxxxxxxxxxxxxx
xx
xxxxxxxxxxxxxreyiennlkvhkvkvrineknxxxxxxxxxxxxneekdgfynishsi
eekvknldxxx-----

-----xxxxggl nne-----

-----innineygynnihlefy-----
-----xxxxxxkrell-----

-----xxymfql---fisyk
nffw-----keitsliw
miis-----ilsvikkifkn-----xx-----xxxxxen
iqanntfvt-----

-----vyr-nsi-----x-----x-----
-----q-----i
p-----
----snnLTIGDIIIns-----
----KMTLPCDCLLLtg-----

-----nvIVDESLLTGESRPMKKic-----

-----XX
XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----XXXXXX
fnt-----
-----x-----NILYA--GTDV--x-----stl
nf----teni-----xaIVINVSITYKGkymqnvlf-----

-----pnpllfkydsq|pivfiftimfsfvc|
-yfqirylg-----lnmtsiyftlGTLSQL
LPVWTPVVINIGLNI STN-RLkkekx-----

-----iCCI-APSRIPICGKIRVFFFDKTG-----
-----TLTDHKIEFx-----xxxxcnni|xxxxxxxxxxxxxxxxxxxx
XX
XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

-----xxxxx--xxxx
nhddnniXX
XXn|
nekeqlixxxxneiXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXnnInXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

XX
XXXXXXXXXXXXXXXXX-----xesnssmnxxtsllyn----xxxxxxx
XXXXXXXXXXXXXXXXxxagcsxy---xxnni-----xx-----
-----xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxdv|ktyefdytkxsttlxxxxfxxxek-----

-----x-----
-----xx-x-----f-----
-s-----k-----gsf
d-----kiymkciknexxxx-----

-----f-kkkeqey--skn----gfyvlALAFKi i-----
-----xnmkhehi ld |prqxlekd mnfLSLIMFNHNIKDASMV I QTLKGss-IRP
VILTDNAYNCLYVGNKIGLxxxxxxxxxxxxxxxxxxxxxxxxinxxnk nnyln
eln-----tnnhxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxtxxxxxxxxxxxxxxxxxxxxxxxxdxdf
knnetqkkexxx
xxxxxxxxhvkexnkrnxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxiiltgeayt-----

-----firyhvxqi ktpd-----

-----xxxxxxx-----xxxxxxx
filri--rIFS--RLTPNNKIEVIRDfi-----
--kf--dy-----ISGMCGDGSGNDGALKISHAGLAL-----
-----snld-----

-----TSVVSPFSSKn-ENLKSVIdilREGRA CLVTSINCY-----K

_____ | ces | yxvvrxxxxxx _____

_____ xxxxx _____

[illegible]

hsactlnecekvliitkdgnkyikkikfkfhnvcyvmdvffxxxxxxxxmx

xx
-----kdninfkdsiypcdei lhvdnxxxxxxxxxpfdetteynksr lq
dnnr ityixx-

-xxxxxxxxxxxxxxxxxxxxxxxxxtglrnek-

-----xindrki lygecnlniksd-
-xxxxxfkeim-

-----npffifq-- ifami
vws|-----dniyeztis
ilfi-----tsisiilelkn-----xx-----kn
qkkiknmIny-

-----tcp-inv-
---ryr-----nt-syi----i
s-
---sseLVPGDIYEIkn-
---NMTIPCDTILsg-

-----svtMSEHMLTGESVPIHKeqx
XXXXXXXXXXXXXXXXXXXXX-----XXX
XX
XX
XXXXXXXXXXXXXXXXXXXXX-----XXXX

qkn-
-----xxxxxxxYMLYG-GTYVls|xxxxxxx-nnk
ee---nril-----gLVIKTGFITTKGkivnnily-

-----x-kkkeInlindsykfliiliiyaffsvfi
-llyitIsne-----ytnhiiikcLDIIIDA
IPPALPTTITVGISIAIS-RLkkkfX

-----iSCL-CPHKINIAGQINTMVFDKTG-----
-----TLTENNLQF_x-----xxxxqnkkn-----

-----XXXXXXXXXXXXXXXXXXXXX
ddnmihnXXX
XXXXXXXXXX-----dl
hindstcxxxxxnsetXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXyskneXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
-----ximgdvle--iImfnf-----
-----xxxxxxnnnsxxi--xxxkkn-----
-----XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXniIkrfefqsrIq-rmsvxxxxtxxxnnXXXXXXXXXXXXX-----

-----XXXXXXXXXXXXXXXXXXXXXyxxx
xc-----k-----
-----gsp
e-----kikelclkskxxxxx-----

-----deiInky--tkq--gmr iLSISYKrv-----
-----kskninIInvkr sxvesnlhfLGFLIFTNNMEKNAPDI IHNLQTsg-CQC
IMSTGDNVLTSIHVAKKCGI-----inxxvesi-ii g
dvi-----pvvgxx-----XXXXXXXXXXXXX
XXXnIn
gdningdniXXX
XXXXXXXXXenkkxknyk-----XXXXXXXXXXXXXXXXXXXXX-----
-----xxxivltgkafi-----

-----flkkkfxsfhIpyXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

XX
XX
XX
XX
XX
XX
XX
XX

ilrtc--tVYA--RMKPKDKSDLILSLk-----
--klxns-----YVGMCGDGANDCLALSCADIGISL--
-----xnnne-----

-----SSICSSFTSNk-LCLHSIVhiLIEGRASLVNSFQLF-----K
fis-lysxmxcsqvlilysisnkh-----tdnqyifi
divtilplxfmcwtsasxk-----lsknipi-----xklfsfpi
l-isiygqiiixffvmislvlmnlsfyxxxxxxxx-----

ekxxxxylkaqntllyilcsfq-nlfmcislniknewrk----svftniafiwmsfl
llmntcitxsseiflvxxx-----dilkqyl-----
-----xlitfpxxxif--lffilffnflcs-----
-----ysyekyi-----

-----ikyfekrexqkxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxx-----

n
>spoV_V201 NP_594863.1
m-----

-----scILDESMVTGESVPARKfp-----

-----XXXXXXXXXX-----

-----XXXXXX
fsp-----
-----HLIHA--GTKFiki-----dst
ps----tpcl-----iSVVRTGFRSNKGqlirnlly-----

-----x--nlrpsqlyldsmsflktmailsfvsivf
-iaiylnlyna-----sfghvvlsLDVLTIL
VPPALPATISVGIANSLA-RLsral-----

-----iYTT-SPESIHNAGCLSTFVFDKTG-----
-----TLTENSVQLx-----xxxxksgsn-----

-----XXXXXXXXXX
sldstkix-----
-----ah
ayrvatc----sqsl-----

-----xxxxxlvgdple--vtlftq-----
-----fngtxxa--xxxasn-----xx-----

-----XXXXX
xxxxxxxxxxxxxsiykalefdpvlr-rmsv----i-----

-----xxxxxx-----xxxxxf-----
-t-----k-----
-----gap
e-----silai ssqqsxxxx-----

>mmuV_V201 NP_083373.1

-xxxxxxadeal

npyygfgq--afsia
lwla-----dhyywyalc
ifli-----saisiclalyk-----xx-----kq
sltlrldmvl-----

-----svr-vqv-----
-xrpq-----ge-eev-----v
d-----
---sseLVPGDCLVLpq-----
---eGGVMPCDAALVag-----

-----ecvVNESSLTGESTPVLKta-----

-----xxxxx-----

-----xxxxxxx-----
thr-----
-----x-----HTLFC-GTLIlqa-----ray
vg---prvl-----aVVTRTGFACTAGglvssilh-----

-----x-rpisfkfykhsmkfvaalsvlallgtvy
-siiilyrnrv-----pvreiviraLDLVTVV
VPPALPAAmTVCTLYAQS-RLrtqg-----

-----iFCI-HPLRINLGKKLRLLVCFDKTG-----
-----TLTEDGLDV-----mgvvp-----
-----x-xxx-----xxx-----

pl--vpexxxxx-----
-----xx-----pl
lralatc-----hals-----
-----qlhdt-----

pvgdpmd--lkmves
tgwv--l---eeg-----xx
xxxxxxx-----xxxxxxxxxxxxxxxxx-xxxxx-----xx
svlcrfpfssalq-rmdv---v--vt

x-----x-x-xx-x
-----xx-x-----y
-v-----k

gsp
e-----lvaslcspetxx

sdf-sqvlqsy-taa-gyrvVALAGKpl
xxapslaaaqltrdxverelsLGLLVMRNLLKPQTAPVIQTLRKtg-IRT
VMVTGDNLQTAVTVARACGM-----vgxxehla-vih
ath-----peqgxx-xxx
-----xxxxxxxxxm-----xgak
atgypx
xxepqsx-h

lalsgstfa

vlrkhf-pklpk

vlvqa-tVFA-RMAPEQKTELVCELq
--rl-qy-----CVGMC GDGANDCGALKAADVGISL
sqae

ASVVSPFTSSm-ASIECVPtvIREGRCSLDTSFSVF-----k

```
yma-lys-l-tqfivllityin-----tnlgdlqflai
dlvitttvxvlmsrtgpa-lt-----lvrrapp--x---a||svpv
l-gslllqval--vagiqlggyflviaqpw-----xxxx--
```

pd-----nlpnyentvvfslsgfq-ylllaavskgapfrq-----plytnvpflvalall
gsvlvglil--lvpgllq-----gplglrn-----
-----xxdssf-----ll--llglvafnfvg-----
-----fmlesvl-----

-----dqclpac|xlrx--xxxx-----

-----XXX-----XXXXXXXXXXXX-XXXXXXXXXXXX-----

>mmuV_V202 XP_999996.1

[illegible]

tcvraavkdcevvllrttdefrvwfcakihflpven-qpnlnakcxxxxxxxxhxx-----
-----xxxxxxxxxxxxx-----

-----sqsqsqmqmryfthhsiryfwn-----daihnfdflkgld
gvscasly-----

-----xxxagltqgm-----

-----hayrkliygvneiavkvp-----
-xxxxxxikevl-----
-----npfyifq--lfsvi
lwsv-----deyyyyala
ivim-----svvsiisslys-----xx-----kq
yvmldmvat-----

-----hst-vrv-----
-xxxren-----ee--iee-----i
f-----
---stdLVPGDVMI lpl-----
---nGTVMPCDAVL lng-----

-----tciVNESMLTGESVPVTktn-----

-----xxxxxxxxxxxxx-----

-----xxxxxx
thk-----
-----x-----HTLFC--GTTViqt-----rfy
tg---elvk-----aIVRTGFSTSKGqlvrsily-----

-----x--kptdfklyrdaylflcllvvagigfiy
-tiinsilnek-----evqeiiiksLDIITIT
VPPALPAAmTAGIVYAQR-RLkkvg-----

[illegible]

lmlhg--tVFA--RMAPDQKTQLVEALq-----
--nv--dy-----FVGMCGDGANDCGALKRAHGGISL--
-----sele-----

-----ASVASPFTSKt-PSISCVPhIREGRAALMTSFCVF-----K
fma-lys-i-iqyfsvtllysil-----snlgdfqflfi
dlaiilvvxftmslnpaw-ke-----lvaqrpp--x---glisgal
l-fsvlsqivi--svgfqs|gffwvkq-----xxxxxxx
xxxxxxxxxxxxxxxxxxxxx-----xxxxxx-----
sc---kiqnyenttvffissfq-y|tvavafskgkpfrq---pcyknyffvisvii
yvfilfim--lhpvasv-----dqvleim-----
-----xpyqwr---iy--mliivlinafvs-----
-----itveesv-----

-----drwgkcc|xwalxxxxxx-----

-----xxx-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-----
-----x-xxxxx-----

a

>mmuV_V203 NP_766201.2

m-----

XXXXXXXXXXXXXXXXXXXXX-----meifgy
r-----xxxxxxalcligsifslgmlplvfywrpawrvwa
ncvpcslqeadvvlkttdefkiyswkkviwislsalstsgltpxxxxxxxgxx-----
-----xxx-----
-----irkpdlkvryikvqkiryvwn-----nlegqfqkigsled
wlssakih-----
-----xxxxlgl tsee-----

-----qeirrl icgnaidveit-----
-xxxxxxikevl-----
-----npfyifq--lfsvc
lwfs-----edykeyala
iilm-----svisialtvyd-----xx-----qq
svklhhlves-----
-----hns-itv-----x-----
--xxerk-----ag--aqd-----l
e-----
--srILVPGDLLILtg-----
--sRVQMPCDAILIdg-----

scvVDEGMLTGESIPVTktpr
xxxxxxxxxx
xxxxxxx
dpr
xHVLFCGTEViqa-kaa
gs-gavr-aVVLQTFNTAKGdlvraily
x-kpmnfklyrdairflcl
e-ppeevvrkaLDVITIA
VPPALPAAITGTIIYAQR-RLkkkg
iFCI-SPQRINVCGQLNLVCFDKTG
TLTRGGGLDPwgvvpx-xxx-xxx
avhsfasxxxxx
xx-pl
caamasc-hsl i
ldgt
iqgdpId-lkmfea
tkwe-m-tas-xx
xxxxxxxxxxxxxxxxxxxx-xx
ai v h q f p f s s a l q - r m t v - i - v q
x-x-x-xx-x
x-x-f
m-k
gap
e-rvasfcqpdtxx

[illegible]

-----npfyvfq--aftlt
lwls-----qgyieysva
iiil-----tvisivlsvyd-----xx-----qq
svklhklvee-----

-----hnk-vqv-----x-----
--xxvrd-----kg--lqe-----l
e-----
----srILVPGDILILpg-----
----KISLPCDAILIdg-----

-----scvVNEGMLTGESIPVTktp-----

-----xxxxxxxx-----

-----xxxxxxxx-----
dyr-----
-----x-----HVLFC--GTEViqv-----kps
aq--glvr-----aVVLQTYNTAKGdlvrsily-----

-----x--rpInfklyndafkfmvflacvgvvgffv
-algvmyhev-----ppretatmaLILLSAT
VPPVLPAAITIGNVYAQK-RLkke-----

-----iFCI-SPQRINMCGQINLVCFDKTG-----
-----TLTEDGLDL-----wgtvp-----
-----x-xxx-----xxx-----

avhsfasxxxx-----
-----xx-----pl
caamtsc--hsl i-----
-----ldgt-----

i qgdpld--lkmfeg
tgwn-m-eds-xx
xxxxxxx-xxxxxxx-xxxx-xxxx-xx
t i l r q p f s s g l q - r m s v - i - a q

x-x-x-xx-x
xx-x-y
m-k
gap
e-mvarfcsetxx

knf-sqelrny-tvq-gfrvlALAHKtl
xmerlsdmhdlarexveselaflGLLLIMENRLKKETRPVLKELSEar-IRT
VMVTGDNLQTAITVAKNSEM-ipxxsqvv-ive
ane-pgdlxx-xxxxx
xxxxxxxx-s-gkk
dtyidignsx
xxagkg-yh
famsgksyq
vlfhhf-ysmlpq

ilvng-tIFA-RMSPGQKSSLVEEFq
kl-ny-YVGMCGDGANDCGALKMAHAGISL
seqe
ASVASPFTSKt-ANIECVPhIIREGRAALVSSFGVF-k

```

y|t-myg-i-iqfigtsllwql-----qlfgnyqyl|q
dvaitlmvxltsinhay-pk-----lapyrpa---x---q||spql
l-lsvfmnscf--tcivqctfltkqppw-----xxxxxxx
x-xxxxxxxxxxxxxxxxxxxxxxx---xxxxxx-----
pa---svlsfegttlwpivtfncisaafifskgkprk---piyanylfsllasa
agltifil--fcdfdl-----yrkmefi-----
-----xxptswr---vs--iliaafvqfcva-----
-----ffvedav-----

```

lrpclsaraetlvieirdkegssrq|ftvqvqteavvdgslelpxxxxxxxxrxx
 xxx
 xxxxxxxxxxxxsltqkqvlryyilqgqryvwm-----etqqafcqvslldh
 gracddihxxx
 -----sglsld
 -----qavrkti ygpnvigipvk-----
 -xxxxxxvdeal-----npyygfq--afsia
 lwla-----dhyywyavc
 ifli-----saisiclslyk-----xx-----kq
 smtlrdmvl
 -----svr-vqv-----
 -xrbg-----ge-eev-----v
 d-----sseLVPGDCLVLpq-----
 -eGMMPCDAALVag-----
 -----ecvVNESSLTGESIPVLKta-----
 -----xxxxx-----
 -----xxxxxx-----
 thr-----x-----HTLFC--GTLVlqa-----ray
 lg--prvl-----aVVRTGTGFCTAKGglvssilh-----
 -----x-rpisfkfyrhsmkfvaalsvlallgtiy
 -siiilyrnrv-----pvkeiviralDLVTVV
 VPPALPAAmTVCTLYAQS-RLrtgg

iFCI-HPLRINLGGKLRLVCFDKTG
TLTEDGLDI-mgvvp
x-xxx-xxx

pl-vpexxxxx
xx-pl
lralvtc-hals
qlhdt

lvgdpm-d-lkmves
tgwv-l-eeg-xx
xxxxxxx-xxxxxxxxxxxxxxxx-xxxx-xx
svlrpfssalq-rmdv-v-vt

x-x-x-xx-x
xx-x-y
-v-k
gsp
e-lvaslcspetxx

rdf-pqvlsy-taa-gyrvVALAGKpl
xxapsleaaq|trdxveqels|LGLLVMRNLLKPQTTPVIQTLRKtg-IRT
VMVTGDNLTAVTVAKACGMvgxxehla-i ih
ath-peqgxx-xxx
xxxxxxxxxm-xgak
atdypx
xxesqsx-h
lalsgstfa
vlakhf-pklpk

m-----

[illegible]

[illegible]

vdf-ekvledy--tkq---gfrvlALAHrkI-----
xxxltwhkvqhvsrda-i enmdfMGL IIMQNKLKQETPAVLEDLHKan-IRT
VMVTGDNMLTAVSVARDCGM-----ilxxdkvi-iae
alp-----pkdgxx-xxxxxx-----
xxxxxxxxxxxxx-a-----xdse
aipiklahdx-----
xxdlqv-tryh-----
-----famngksfs-----
-----vilehf-qdlvpk-----

Imlhg-tVFA-RMAPDQKTQLVEALq-----
-nv-dy-----FVGMC GDGANDCGALKRAHGGISL-----
-sefe-----

-----ASVASPFTSKt-PSISCVPnIIREGRAALMTSFCVF-----K
fma-lys-i-iqyfsvtll lysil-----snlgdfqlfi
dla i ilvvxftmslnpaw-ke-----lvaqrpp-x-gl isgal
l-fsvlsqivi-svgfqslgffwvkq-----xxxxxxx
xxxxxxxxxxxxxxxxxxxxx-----xxxxxx-----
sc-----kiqnyenttvffi ssfq-y ltvavafskgpfrq-----pcyknyffvisvii
yvfilfim-lhpvasv-----dq lleim-----
-----xpyqwr-----iy-mliivltnafvs-----
-----itveesv-----

-----drwgkcc|xwalxxxxxxx-----

-----xxx-----xx-----

-----x-----xxxxx-----

a

>rnoV_V203 XP_221355.4

m-----

xxxxxxxxxxxxxxxxxxxxxxxx-----

-----meifgy

r-----xxxxxalcligsifslgmpllvfywrpawrvwa

ncvpcslqeadivllrttdefkiyswkkvmwislsalsstsgltpxxxxxxxxexx-----

-----xxxx-----

-----irkpdlkvryikvqkiryvwn-----nlegqfqkigsled

clssakih-----

-----xxxxlgl tsee-----

-----qeirrlicgpnaidvei-----

-----xxxxxxvkevl-----

-----npfyifq--lfsvc
lwfs-----edykeyala
iilm-----svisialtvvd-----xx-----qq
svklhhlves-----

-----hns-itv-----x-----
--xmerk-----ag-aqd-----l
e-----
---srILVPGDLLILtg-----
---sRVQMPCDAVLIdg-----

-----scvVDEGMLTGESIPVTKtp-

-----xxxxxxxx-----

-----xxxxxx
dpr-----
-----x-----HILFC--GTEViqa-----kaa
gs--gtvr-----aVVLQTFNTAKGdlvrsily-----

-----x--kpmnfklyrdairflclvgtatigmiy
-tlcvyvlsg-----ppeeivrkaLDVITIA
VPPALPAAITTGIIYAQR-RLkkkg-----

-----iFCI-SPQRINVCGQLNLVCFDKTG-----
-----TLTRGGDL-----wgvvp-----
-----x-xxx-----xxx-----

avhsfasxxxx-----
-----xx-----pl
caamatc-----hsl i-----
-----ldgt-----

-----iqgdpld--lkmfea-----
-----tqwe---m---tvs-----xx-----
-----xxxxxxx-----xxxxxxxxx-----xxxx-xxxxx-----xx-----
-----ai lhqfpfssalq-rmtv----i---vq-----

-----x-----x---x---xx---x-----
-----x-x-----f-----
-m-----k-----gap
e-----rvasfcqpdtxx-----

-----ttf-iselqvy-ttq---gfrvlALAYKkl-----
-----etdcptttlrmrexvesdlifLGLLI LENRLKEETRPVLEELISar-IRT
AMITGDNLTQAITVARKSGM-----vsxxqkvi-lve
ane-----atdsxx-xxxxx-----
-----xxxxxxxxx-l-----xgsq
dtyinireex-----
-----xxngre-gnyh-----
-----falsgksfq-----
-----visqhfs-sllpk-----

-----iling-tIFA-RMSPGQKSSLVEEFq-----
-----kl-dy-----FVGMC GDGANDCGALKMAHVGVS L-----
-----seqe-----
-----ASVASPFTSKt-PNIECVPhIIKEGRAALVTSCMF-----K

yma-lys-m-iqyvgllllywkt-----nslsnyqflfq
dlaittlxvtmnlngan-pk-----lvpfrpa---x---rlispl
l-lsvilnill--slamhivgfilvqkpw-----xx-xxxx
x-xxxxxxxxxxxxxxxxxxxxx-----xxxxxx
ns---tfasfenttiwflgtin-civvalvfskgkpfrrq---ptytnyifvlvlilq
mgvcifil--fadipel-----hrrldll
-----xxpvlwr---vy--ilimvssnfvvs
-----lavekai-----

```
|
>rnoV_V204 XP_221354.4
m-----
-----
-----
-----
-----
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-----
-----
-----
-----
-----
-----
-----
-----
XXXXXXXXXXXXXXXXXXXXX-----
-----levfgy
q-----xxxxxxalc|vtailtlgavqlmfywrpewwwwt
```

scipcpIqeadivllrttdefrrymrkkvfcIhlstIkipisknpxxxxxxxxhxx-----
-----xxxx-----

-----vmkpelklrciqvqkiryvwd-----flkkrfqkvglled
snscdfih-----

-----xxxxlgl tsee-----

-----qevrrlvcpnaieveiq-----
-xxxxxxvkqvl-----
-----npfyvfq--aftlt
lwls-----qgyieysva
iiil-----tvisivlsvyd-----xx-----qq
svklhklved-----

-----hnk-vqv-----x-----
--xxvrd-----kg--lqe-----l
e-----
---srILVPGDILILpg-----
---KISLPCDAVLIdg-----

-----scvVNEGMLTGESIPVTKtp-----

-----xxxxxxxx-----

-----xxxxxx-----
dyr-----
-----x-----HVLFC--GTEViqv-----kps
gq--gpvr-----aVVLQTYNTAKGdlvrsily-----

-----x--rpInfklyndafkfmvflacigvvgffv
-algvlyhev-----ppretvtmaLILLTAT
VPPVLPAAITIGNVYAQK-RLkkkk-----

-----iFCI-SPQRINMCGQINLVCFDKTG-----
-----TLTEDGLDL-----wgtvp-----
-----x-xxx-----xxx-----

avhsfasxxxx-----
-----xx-----pl
caamasc-----hsl i-----
-----l l dgt-----

-----i qgdpl d--l kmfeg-----
-----tgwn--m-----edg-----xx-----
-----xxxxxxxx-----xxxxxxxx-----xxxx-xxxx-----xx-----
-----t i l r q f p f s s g l q - r m s v ----i ---aq-----

-----x-----x--x--xx--x-----
-----xx-x-----y-----
-m-----k-----
-----gap
e-----mvarfcsetxx-----

-----knf-pqelrny--tvq---gfrvIALAHKt l-----
-----xmekvsdverlarexveselafLGLLIMENRLKNETRPVLQELSEar-IRT
VMVTGDNLQTAITVAKNSEM-----ipxxsqvi-ive
ane-----pgd lxx-xxxxx-----
-----xxxxxxxx-s-----ekk
dtyidignsx-----
-----xxcgkg--yh-----
-----famsgksyq-----

-----v l f h h f - y s m l p q-----

i | vng--tVFA--RMSPGQKSSLVEEFq-----
--kl--ny-----YVGMCGDGANDCGALKMAHAG | SL--
-----seqe-----

-----ASVASPFTSKv-ANIECVPh | IREGRAALVSSFGVF-----K
ylt-myg-i-iqfigts | lywq | -----qlfgnyqy | lq
dvaitlmvx | tmsinhay-pk-----lapyrpa--x---q | lspq |
l-lsvfmnscf--tcivlvctflsvkqppw-----xxxxxxx
x-xxxxxxxxxxxxxxxxxxxxxxx-----xxxxxx-----
pa---svlsfegttlpivtfn-cisaafifskgkpfrk---piytnylfs | l | ltsa
vgltvfil--fsdfqdi-----yrrmefi-----
-----xxttswr---is--ilvaafvqfcva-----
-----ffvedai-----

-----lqnrelwl-fikxxxxxxx-----

-----xxx-xx
xxxxxxxxxxxxxxxxxxxxxxx-xxxxx-----

|
>dreV_V201 XP_697103.2

m-----

[illegible]

-----ecmVNESMLTGESIPVMKtp-----

-----xxxxx-----

-----xxxxxx-----
sqr-----
-----x-----HTLFC--GTQIiqax-----ggg
pg---kgai-----aVVTCTGFLTAKGdlissily-----

-----x--qpldfrfyrdamkfllflglaligtiy
-slvilksnt-----pwkeliirsLDIVTII
VPPALPAAiTTATIYAQN-RLkrqg-----

-----vFCI--SPPRINICGKISLFCFDKTG-----
-----TLTEEGLDV-----wgvme-----
-----x-xxx-----xxx-----

el--vpdxxxxx-----
-----xx-----lm
lsalasc---hsva-----
-----llggq-----

-----algdple--lkmies-----
-----tgwe--l--xxxend-----xx-----
-----xxxxxxxx-----xxxxxxxxxxxxxxxxxxxx-xxxxx-----xx-----
-----aivrrfpfssslq-rmsv---v---tv-----

-----x-----x--x--xx--x-----
-----xx--x-----f-----
-i-----k-----
-----gap
e-----mvasfchkesxx-----

-----shf-shtlrey--asq---gfrvLGLAYKhI-----
-----aketdlstvervxvekgmnfLGLLVMKNQVKPESAEVIQTLTLaq-LRP
VMVTGDNILTAVNVARVCGM-----vpxxekvi-fvh
asp-----ptagxx-xxx-----
-----xxxxxxxxxt-----xntq
--qtidipx-----
----xxqyqsxvgyh-----
-----laingmsfa-----

-----alcdf-peylpk-----

vlmrg-tIYA-RMTPEQKTQLVKALq-----
--kl--ny-----RVGMCGDGANDCGALRAADVGVSL--
-----seae-----

-----ASVASPFTSKs-DNISCVPIIIKEGRCSLVTSFSLF-----K
yma-lys-l-iqfasvliilytek-----tnlgdlqlfff
dlvltvtlxilmgrggps-nd-----lhqrpa-x--slslpv
l-asllmhtvl--lilaqvsgllitmsqdW-----xxxx--
-----xxxxxx-----
aa--nlpnmedtsvfavsgfq-yiimsvvitkgfpykk--plyhnvlfvcalfi
falmswlv--lfrhti--hrvlsly-----
-----xxxdmsyk--ll--lvaiaalnffic-----
-----filleffi-----

-----dggalnc|xn|rx--xxxx-----

tpfyvfq--ifsvt
vwyn-----deyayyasI
ivil-----slgsivmdvyq-----xx-----tq
eirI rsmvhs

tes-vev
ire-----gt-emt-----i
g
sdqLVPGDILLlpp
hgCLMQCDSVLMng

tv i VNESVL TGESVPITKva-
xxxxxxx
xxxxxxx
kns
x-----NVLFC-GTQVlqt-----rfy
rg---kkvk-----alVLR TAYSTLKGql vrsimy
x-kpvdf rftkd lfkfilflacisgcgfiy
-tiivmimrgn-----tlrriivrsLDIIITIT
VPPALPAAmSVGIINAQL-RLkke

iFCI-SPSTINTCGAINVVCFDKTG
TLTEDGLDF-----hvvrpx
x-xx-----xxx

ei qkvklxxxxx-----xxxxxxxxxxx
xxxxxxxxxxx-----dl
vkaiatc-----hslt
ringv

-----lhgdpld-----lilfqk-----
-----tgwt---m---xxxieg-----xxx-----
-----xxxxxxx-----xxxxxxxxxxxxxxx-----xxx-----
-----svirqftfssslq-rmsv-----i---vf-----
-----x-----x-----xxxxxx-----x-----
-----xx-x-----y-----
-s-----k-----
-----gsp-----
e-----milslcdpntxx-----

-----edy---llqvnsy---aqh-----gfrllAVARRpl-----
-----dlnfnkaskvkrdxvecdlemLGLVMENRVKPVTLGVINQLNRan-IRT
VMVTGDNLLTGLSVARECGI-----irxxkraf-lve
hvp-----geldxx-xxx-----
-----xxnt
vetpnpvtax-----
-----xxghlixssyh-----
-----laigptfa-----
-----vivhey-pelvdq-----

lcsvc---dVFA---RMAPDQKQSLVEQLq-----
---qi---dy-----TVAMCGDGANDCAALKAAHAGISL-----
-----sdae-----

-----ASIAAPFTSKv-PDIRCVPtvISEGRAALVTSFGIF-----K-----

rfqptshdeceyvmedihgtqtikevfkaesdvglarptrsg-----

-----kqekvkvmrfftyrkikywy-----ekdqewlnpadmds
aapfninyqxxx-----

-----xxxiglkeqd-----

-----viasrkiynmnalalalt-----
-xxxxxxfkevl-----
-----gpfylfq--cfsva
lwys-----dnyayyasv
ivii-----tvgsaavavyq-----xx-----aq
ekrirnmvgd-----

-----tis-viv-----
-----rrd-----gh--dit-----i
d-----
---aseIVPMDILILps-----
---nTFILPCDCLLMng-----

-----tviVNEAMLTGESVPVTKas-----

-----xxxxxxxx-----

-----xxxxxx
ehn-----
-----x-----HTLFS--GTTVlqt-----rny
kg---qpvm-----aRVIRTGFSTLKGqlvrsimy-----

-----x--kpqekealkdvmvilvlgfialigfiy
-tviemvsrge-----slkhiiirsLDIITIV
VPPALPAAmSVGIIINANS-RLkkkk-----

-----iFCT-SPTTVNVCGLINVACFDKTG-----
-----TLTEDGLDF-----nclkax-----
-----x-xxx-----xxxx-----

-----xxxxx-----xxxx
dpvkl saxxxxx-----
-----ni
vvaasc-----hslt-----
-----ridgt-----

-----lhgdple--lilvek-----
-----skwi--i--xxxvns-----x-----
-----xxxxxxxx-----xxxxxxxxxxxxxxxxxxxx-xxxx-----
-----svikqhpfnslq-rmsv----i--is-----

-----x-----x-----xxxxx-----x-----
-----xx-x-----f-----
-t-----k-----
-----gsp
e-----miaslcipttx-----

-----edy-mevvdey-aqr-----gfrllAVASKav-----
-----xlnfakalktprdi-meseleflGLIVMENRLKDVTLsvINELSVan-IRC
VMVTGDNLLTAMSVARECGI-----irxxkkaf-lit
hsk-----tekdx-xxx-----
-----xxxxxxxxxs-----xxx-----xdt
se--vraf-----
-----xxavlrxyty-----
-----maiagptys-----

-----vithey-pelvd-----

m _____

-----XXXXXXXXXXXXXXXXX-----
-----XXXfdi iay
k-----XXXXXXXXXfffyalsfgtcg i fr l fl h w f p k r l i q f
r g k r c s v e n a d l v l v d n h n r y d i c n v y y r n k s g t d h t v v a n t d g-----

-----nl a e l d e l r w f k y r k l q y t w i-----d g e w s t p s r a y s
h v t p e n l a x-----

-----xxxxxtg l k a d d-----

-----val r r t y f g p n v m p v k l s-----
-xxxxxxxykevl-----

-----s p f y i f q-----a i s v t
v w y i-----d d y v w y a a l
i i v m-----s l y s v i m t l r q-----x x-----s q
q r r l q s m v v e-----

-----h d e-----v q v-----
-----x r e n-----g r-----v l t-----l
d-----
-----s s e l V P G D V L V l p p-----
-----q G C M M Y C D A V L L n g-----

-----tcivNESMLTGESIPITKsa-

-----xxxxxxx-----

-----xxxxxxx
khg-----
-----x-----NIIFN-GTKVlqt-----kyy
kg---qnvk-----aLVIRTAYSTTKGqliraimy-----

-----x---kpadfkffreImkfigvlaivaffgfmy
-tsfilfyrgs-----sigkiiiraLDLVTIV
VPPALPAVmGIGIFYAQR-RLrqks-----

-----iYCI-SPTTINTCGAIDVVCFDKTG-----
-----TLTEDGLDF-----yalrvx-----
-----x-xxx-----xxx-----

nivqiaaxxxxx-----
-----nv
vraiato---htls-----
-----kinne-----

-----lhgdpld---vimfeq-----
-----tgys---l---xx-----xxx-----
-----xxxxxxxx-----xxxxxxxxxxxxxxxx-----xxx-----
-----qivkqftfssglq-rqsv---i---vt-----

-----x-----xx---x-----
-----xx---x-----y-----
-c-----k-----
-----gsp
e-----mims|crpetxx-----

-----enf-hdiveey---sqh----gyr||AVAEl-----
-----vvgsevqktprqxiecd|t||GLVALENRLKPVTTTEVIQKLNEan-IRS
VMVTGDNLLTALSVARECGI-----ivxxksay-lie
hen-----gvvdxx-xxx-----
-----xxxxxxx-----xxx-----hte
rq--pkivx-----
-----xtkmtxkdcc-----
-----faigstfs-----

-----vvthey-pdlldq-----

|vlvc-nVFA-RMAPEQKQLLVEHLq-----
--dv-gq-----TVAMCGDGANDCAALKAAHAGISL-----
-----seae-----

-----ASIAAPFTSKv-ADIRCVIt||SEGRAALVTSYSAF-----L
cma-gys-l-tqfisilllywia-----tsysmqflfi
diaivtnlxfllsktrah-ke-----lastppp-x-silstas
m-vslfgqlai-ggmaqavvfclitmqs-----xxxxx-----
-----xxxxxx-----
de---drkslgtaifyvsflh-yivlyfvfaagppya---siasnkafllismigv
tvtciaiv-vfyvtpi-----qyflgl-----
-----xqpqefr---fi-ilavatvtavis-----
-----iiydrcv-----

-----dwiserlrxiix-----

xxx

x

a

>ggaV_V201 XP_422709.2

m

xxxxxxxxxxweiygy

e xxxxxxvltvgvicsggfllllywmpqwrvka

tckkttlkdcenvllrttdefkiwfcakvrvmplgasplqnpdpxxxxxxxxhxx

xxxxxxxxxxxxxxxxxxx

lpvsraairyfthsvkyfwn dsqsfdvvrldd

stfcssih

xxxxrgltkem

hdyrkmffgineiavkvp

xxxxxxikevl

-----npfyifq--lfsvi
lwit-----deyhyyala
ivim-----svisivsslyt-----xx-----kq
yvmIhdmvaa-----

-----hsi-vrv-----
--xxrrn-----qe--iee-----i
|-----
---stdLVPGDIMLlps-----
---nGTIMPCDAVLLsg-----

-----tcivNESMLTGESVPVKin-

-----xxxxxxxxxxxx-----

-----xxxxxx
ahk-----
-----x-----HTLFC--GTNViqt-----rfy
tg--elvk-----aLVVRTGFNTAKGqlvrsily-----

-----x--kptdfklyrdaywflslvvvagigfiy
-tivnsilnev-----pahtiviesLDIITIT
VPPALPAAmTAGIVYAQR-RLkkig-----

-----iFCI-SPQRINICGQLNLVCFDKTG-----
-----TLTEDGLDL-----wgirr-----
-----x-xxx-----xxx-----

lpeervcxxxxx-----
-----xx-----ef
iacmatc---hslt-----
-----kiegv-----

-----lsgdpld--lkmea-----
-----igwi---l-----eea-----xx-----
-----xxxxxxx-----xxxxxxxxxxxxxxxxxxxx-xxxxxxxxxxxxxxxxxxxxx-----
-----givrqpffssvlq-rmcv----i--ar-----

-----x-----x-x-xx-x-----
-----xx-x-----y-----
-m-----k-----gap
e-----viaslckgetxx-----

-----vdf-esvleey-tkq-----gfrvIALAHRkl-----
-----xxxltwhkvqtinrda-iesnmdfMGLIIMQNKLKQETPAVLEDLHKan-IRT
VMVTGDNMLTAISVARDCGM-----ilxxdkvi-iae
alp-----pkdgxx-xxxxxx-----
-----xxxxxxxxxxxxxa-----xnse
dipvkllvhx-----
-----xxdlqv-tykh-----
-----famngksfa-----

-----vil ehf-qdlvpk-----

lvlhg-tVFA-RMAPDQKTQLVEALq-----
-nv-dy-----YVGMCGDGANDCGALKRAHGGISL-----
-----sele-----

-----ASVASPFTSRt-PSISCVPkIIREGRAALITSFCVF-----K

ncvpcsl eeadvvl lrttdefr iysrknvtw isvsg i--- iksr lxxxxxxxdxx---
-----xxxx-----

-----l mkps lqvks iqvqk i ryvwn----- i yakqfqkv galed
hhtcsai h-----

-----xxxxsgl tcs e-----

-----qslrrvicgpntidvpvi-----
-xxxxxxikevl-----
-----npfyvfq--l fsvc
lwfa-----edymeyaaa
i iim-----sllsisltvyd-----xx-----qq
svklqr lves-----

-----hns-imv-----x-----
--xxrnk-----eg--fqe-----l
e-----
---shhLVPGDMVVLke-----
---gKALLPCDAI L lsg-----

-----qci VNESMLTGESIPVTktq-

-----xxxxxxxx-----

-----xxxxxx
dyk-----
-----x-----HVLFC--GTEViqt-----kgd
dr---gvvk-----aVVLQTFNTAKGdlvrsily-----

-----x--kpmnfrlyrdalrflmcliafaaigmiy
-tvcvfalnge-----eagevvkkaLDVITIA
VPPALPAAITTGIIYTQR-RLkkkg-----

-----iFCI-SPQRINMCGQLNLI CFDKTG-----
-----TLTEDGLDL-----wgl lp-----
-----x-xxx-----xxx-----

dvrrfpaxxxx-----
-----xx-----pa
framvvc-----hsl i-----
-----vlegk-----

-----iqgdpld-vkmfea-----
-----tnwv--i-----dds-----xx-----
-----xxxxxxxx-----xxxxxxxx-----xxxx-xxxx-----xx-----
-----tilhqfpfssalq-rmsv-----i---aq-----

-----x-----x--x--xx--x-----
-----x--x-----f-----
-t-----k-----
-----gap
e-----mvatlcraetxx-----

-----snf-eskl lfy--taq---gfrvIGLAYKsl-----
-----qsgkqstdltrexvesdltfLGLLIMENRLKRETKPVEELSAah-IRS
VMVTGDNIQTAVTVAKNAGM-----isxxnrvi-lve
ank-----ipgsxx-xxxxx-----
-----xxxxxxxx-d-----xgnl
dsqsgtgrrx-----
-----xxaaep-gqfh-----
-----famsgksyq-----

-----vvaqyf-shl lpk-----

|||na--tVFA--RMSPSQKSSLVEEFq-----
 --kl--dy-----FVGMCGDGANDCGALKVAHAG|SL--
 -----sege-----

-----ienra|w|-w|kxxxxxxxx-----

>ggaV_V203 XP_422713.2

XXXXXXXXXXXXXXXXXXXXX-----leafgy
k-----xxxxxxalciagyilscgallllywkpewdvwa
ncvpcslleadvillrttdefqkytrkkytwidlstltlptgsnsxxxxxxxxdxx-----
-----xxxx-----
-----imkpqlkmrciqvqkiryid-----fsvkefrkvgsled
sntchsih-----
-----xxxxagltgee-----

-----rkisqlvcgpnaieveir-----
-xxxxxxfkeil-----
-----npfyvfq-aftlt
lwls-----qgyieysva
iivl-----svisvgltyd-----xx-----qq
stkldhlvee-----

-----hmk-vqv-----x-----
-xxtkn-----eg-fke-----l
e-----
-shyLVPGDVFLldg-----
-kKLSLPCDAVLldg-----

sc i V N E G M L T G E S I P V M K t l -
-
-
- x x x x x x x x x x -
-
- x x x x x x -
d y r -
- x - H V L F C - G T E V i q a - k s s -
g r - g p a r - a v V L Q T G F N T A K G d l v r s i l y -
-
- x - r p l n f q l y r d a f k f i v g l s a i g v l g l i y -
- t v c v f t y h k k - p v a d v v a m a L L L L T A A -
V P P A I P A A I T T G T V Y A Q R - R L k k k k -
-
- i F C I - T P Q R I N I C G Q I N L V C F D K T G -
- T L T E D G L D L - w g i l p -
- x - x x x - x x x -
-
-
-
-
k i h k f p s x x x x x -
- x x - p v -
c g a m a s c - h s l v -
- v l d k k -
-
-
- i q g d p l d - l k m f e g -
- t h w e - i - e e s - x x -
- x x x x x x x x - x x - x x x x x x - x x x x - x x x x x x - x x -
- a i l h q p f s s g l q - r m s v - v - s q -
-
- x - x - x - x x - x -
- x x - x - y -
- m - k -
-
- g a p -
e - t v s s f c r a e t x x -

sdf-leelkty--tsq---gfrvIALAHKvl-----
xlpedvdvsdlerexaesglefLGLLVMENRLKPETKPVRELAAar-IRS
IMVTGDNLQTAVTVARNADM-----ihxxskvi-ive
ase-----pegsxx-xxxxx-----
xxxxxxxx-a-----aap
tvcantqekx-----
xxgges-snyh-----famngksyq-----

v|vkhf-ysl|pk-----

illna-tVFA-RMSPSQKSSLVEELq-----
kl-dy-----YVGMCGDGANDCGALKMAHAGISL-----
seqe-----

ASVASPFTSqi-PNIQCVPeIIREGRAALVASFAVV-----K
ylt-lyg-l-iqfvgtallfwql-----qifgnyyqliq
dmvitllvxltmslteay-pk-----lapyrpp-x-qlispl
l-lsvilnvcf-tiamqtcgfllvkkqpww-----xxxxxxx
x-xxxxxxxxxxxxxxxxxxxx-xxxxxx-----
hs-tvlsyegttlwplssvn-ciivafvfsgkpfrk-piytnyvfsalltlq
latclflf-ladmdav-ysgmqfl-----
xxpviwr-vy-vllmllvtfcvs-----
fftedvl-----

lankhlm-likxxxxxxxx

-----xxx-----XX

xxx-----

d

strict rule

#Supplemental Data 1

#Molecular Biology Reports

#Evolutionary dynamics of spliceosomal intron revealed by in silico analyses of the P-Type ATPase superfan

#Toshiyuki Oda, Ryosuke L. Ohniwa, Masatsugu Denawa, Hideyuki Okamura and Kunio Takeyasu

6507	6508	drelV_IV03	drelV_IV09	rnoIV_IV12	rnoIV_IV13	mmuIV_IV12
6519	6520	anill_IIIA02				
6525	6526	athIV_IV03				
6676	6677	hsall_IIB01	hsall_IIB02	hsall_IIB03	hsall_IIB04	rnoII_IIB01
6678	6679	athI_IB202				
6681	6682	athI_IB101	osal_IB101			
6684	6685	osall_IIB02	osall_IIB05	athII_IIB05	athII_IIB06	athII_IIB07
6690	6691	drelV_IV01	drelV_IV02	drelV_IV04	drelV_IV07	rnoIV_IV02
6694	6695	cnelV_IV04				
6696	6697	athI_IB204	osal_IB203			
6701	6702	anill_IID01	anill_IID02			
6702	6703	cnelII_IIIA01				
7152	7153	ddiV_IV02	athIV_IV02	athIV_IV03	osalV_IV07	
7155	7156	athIII_IIIA04	athIII_IIIA10	athIII_IIIA11	osalII_IIIA02	osalII_IIIA03
7159	7160	athIII_IIIA07				
7168	7169	hsaV_V201	hsaV_V202	hsaV_V203	hsaV_V204	rnoII_IIA101
7169	7170	drelV_IV01	drelV_IV02	drelV_IV04	drelV_IV07	cnelV_IV01
7182	7183	osall_IIB02	osall_IIB05	athII_IIB05	athII_IIB06	athII_IIB07
7185	7186	drelV_IV03	drelV_IV09	rnoIV_IV12	rnoIV_IV13	mmuIV_IV12
8205	8206	osal_IB202				
8221	8222	hsall_IIB01	hsall_IIB02	hsall_IIB03	hsall_IIB04	celIV_IV04
8382	8383	athI_IB101	osal_IB101	osall_IIB02	osall_IIB05	athII_IIB05
8395	8396	hsaV_V201	hsaV_V202	hsaV_V203	hsaV_V204	mmuV_V201
8409	8410	athIV_IV03	athIV_IV10	athIV_IV11		
8412	8413	mmuV_V101	rnoV_V101	ggaV_V101	hsaV_V101	
8980	8981	cnelI_IIA201				
8984	8985	mmuII_IIA201	mmuII_IIA202	rnoII_IIA201	rnoII_IIA202	hsall_IIA201
8991	8992	athI_IB202	athI_IB204	osal_IB203		
8994	8995	drelV_IV05	drelV_IV08	celIV_IV06	drelV_IV10	drelV_IV12
8997	8998	tanV_V201	tpaV_V201			
9007	9008	anill_IIB03	anill_IIB05			
9010	9011	rnoII_IIA101	hsall_IIA101	drell_IIA101	drell_IIA102	drell_IIA105
9011	9012	drelV_IV13	cnelV_IV01	rnoIV_IV08	mmuV_IV07	mmuV_IV08
9018	9019	athIV_IV02	osalV_IV07			
9019	9020	celV_V201	celV_V203			
9020	9021	ggaIV_IV05				
9023	9024	drelV_IV01	drelV_IV02	drelV_IV04	drelV_IV07	rnoIV_IV02
9030	9031	dmeIV_IV04	ggall_IIC01	ggall_IIC02	mmuII_IIC01	mmuII_IIC02
9032	9033	athII_IIA103				
9035	9036	osall_IIB02	osall_IIB05	athII_IIB05	athII_IIB06	athII_IIB07
9042	9043	cnelV_IV02	athI_IB202			
9048	9049	celIV_IV04				
9061	9062	athI_IB204	osal_IB203			
9441	9442	osall_IIB02	osall_IIB05	athII_IIB05	athII_IIB06	athII_IIB07
9446	9447	mgrII_IID01				
9452	9453	athIV_IV02	osalV_IV07			
9461	9462	spoV_V201				
9475	9476	mmuII_IIA201	mmuII_IIA202	rnoII_IIA201	rnoII_IIA202	hsall_IIA201
9480	9481	athV_V101	drel_IB201	drel_IB203	cel_IB201	drelV_IV03

strict rule

9489	9490	celV_V201	celV_V202	celV_V203		
9504	9505	hsaV_V201	hsaV_V202	hsaV_V203	hsaV_V204	cnell_IID01
9508	9509	drelV_IV13	cnelV_IV04	rnoV_IV08	cnell_IIA101	mmuV_IV07
9578	9579	ehilV_IV08				
9582	9583	mgrII_IIC01				
9586	9587	cnelV_IV03	ddilV_IV07	anilV_IV03		
9588	9589	cellV_IV06	osall_IIB02	osall_IIB05	athII_IIB05	athII_IIB06
9591	9592	athV_V101	osaV_V101			
13963	13964	ggall_IIC01	ggall_IIC02	mmull_IIC01	mmull_IIC02	mmull_IIC03
13965	13966	hsal_IB203				
14137	14138	drelV_IV05	drelV_IV08	drelV_IV10	drelV_IV12	rnoV_IV09
14142	14143	athII_IIA103				
14145	14146	athV_V101	osaV_V101			
14154	14155	osall_IIA101	osall_IIB02	osall_IIB05	athII_IIA101	athII_IIB05
14159	14160	drelV_IV03	drelV_IV09	rnoV_IV12	rnoV_IV13	mmuV_IV12
14166	14167	athIV_IV02	osalV_IV07			
14169	14170	pfalV_IV03	cellV_IV04			
14172	14173	hsall_IIB01	hsall_IIB02	hsall_IIB03	hsall_IIB04	cellV_IV02
14181	14182	cnell_IIIA01				
14192	14193	osal_IB203				
14201	14202	celV_V201	celV_V203			
14217	14218	ggall_IIC01	ggall_IIC02	mmuV_V101	mmull_IIC01	mmull_IIC02
14220	14221	athV_V101	osaV_V101			
14233	14234	hsaV_V201	hsaV_V202	hsaV_V203	hsaV_V204	anilI_IIB05
14244	14245	athII_IIA103				
14245	14246	dmeIV_IV04	drelV_IV01	drelV_IV02	drelV_IV04	drelV_IV07
14263	14264	mmull_IIA201	mmull_IIA202	rnoII_IIA201	drelV_IV06	rnoII_IIA202
14264	14265	athIV_IV04	athIV_IV05	athIV_IV06	athIV_IV07	athIV_IV08
14269	14270	athIV_IV03				
14271	14272	drel_IB201	drel_IB203	athI_IB102	athI_IB103	rnoI_IB202
16951	16952	cnelV_IV01				
16952	16953	anilV_IV02				
16961	16962	drelV_IV06	athII_IIA103	mmuV_IV01	mmuV_IV02	ggaV_IV01
16972	16973	athIII_IIIA01	athIII_IIIA02	athIII_IIIA03	athIII_IIIA04	athIII_IIIA05
16974	16975	tanV_V201	tpaV_V201			
16980	16981	mmuV_V101	rnoV_V101	cnell_IID01	ggaV_V101	hsaV_V101
16986	16987	drelV_IV03	drelV_IV09	rnoV_IV12	rnoV_IV13	athIV_IV02
16995	16996	mmull_IIA201	mmull_IIA202	rnoII_IIA201	rnoII_IIA202	hsall_IIA201
16996	16997	hsall_IIB01	hsall_IIB02	hsall_IIB03	hsall_IIB04	rnoII_IIB01
16998	16999	cnelV_IV02				
17205	17206	athII_IIA103				
17214	17215	rnoII_IIA101	rnoII_IIA102	rnoII_IIA103	hsall_IIA101	hsall_IIA102
17218	17219	drelV_IV05	drelV_IV08	drelV_IV10	drelV_IV12	drelV_IV13
17224	17225	athIV_IV01	osalV_IV01			
17241	17242	hsaV_V202	hsaV_V203	hsaV_V204	mmuV_V202	mmuV_V203
17250	17251	cellV_IV06				
17251	17252	dmeIV_IV04	drelV_IV01	drelV_IV02	drelV_IV04	drelV_IV07
17253	17254	athV_V101	osall_IIB02	osall_IIB05	osaV_V101	athII_IIB05
17263	17264	mmuV_V101	rnoV_V101	ggaV_V101	cnelV_IV03	celV_V201
17269	17270	drelV_IV03	drelV_IV09	rnoV_IV12	rnoV_IV13	mmuV_IV12
17697	17698	athII_IIA103				
17700	17701	dmell_IIC01				
17741	17742	cellV_IV04				
17742	17743	athI_IB202	athI_IB204	osal_IB203		
17743	17744	mmuV_V101	rnoV_V101	celV_V101	ggaV_V101	dmeV_V101
17747	17748	mmull_IIA201	mmull_IIA202	rnoII_IIA201	rnoII_IIA202	dmell_IIA201
17759	17760	hsaV_V201	hsaV_V202	hsaV_V203	hsaV_V204	mmuV_V201
17764	17765	ggall_IIC01	ggall_IIC02	mmull_IIC01	mmull_IIC02	mmull_IIC03

strict rule

17784	17785	athI_IB101	osal_IB101			
17793	17794	anilI_IID03	athIV_IV03			
17796	17797	athIV_IV04	athIV_IV05	athIV_IV06	athIV_IV07	athIV_IV08
17819	17820	osalI_IIA101	athII_IIA101	athII_IIA102		

strict rule

nily genes

mmuIV_IV13 mmuIV_IV14 ggalV_IV10 ggalV_IV12 hsaIV_IV12 hsaIV_IV13 hsaIV_IV14

rnoII_IIB03 rnoII_IIB04 dreII_IIB03 dreII_IIB04 dreII_IIB06 ggall_IIB01 ggall_IIB02

rnoIV_IV03 rnoIV_IV04 rnoIV_IV06 rnoIV_IV07 mmuIV_IV03 mmuIV_IV05 mmuIV_IV06

osaIII_IIIA04 osaIII_IIIA08 osaIII_IIIA10

rnoII_IIA102 rnoII_IIA103 dreI_IB201 dreI_IB203 mmuV_V201 mmuV_V202 mmuV_V203
rnoIV_IV02 rnoIV_IV03 rnoIV_IV04 rnoIV_IV06 rnoIV_IV07 mmuIV_IV03 mmuIV_IV05

mmuIV_IV13 mmuIV_IV14 ggalV_IV10 ggalV_IV12 hsaIV_IV12 hsaIV_IV13 hsaIV_IV14

rnoII_IIB01 rnoII_IIB03 rnoII_IIB04 dreII_IIB03 dreII_IIB04 dreII_IIB06 ggall_IIB01
athII_IIB06 athII_IIB07
mmuV_V202 mmuV_V203 mmuV_V204 dreIV_IV01 dreIV_IV02 dreIV_IV04 dreIV_IV05

hsaII_IIA202 dreII_IIA201 ggall_IIA201

rnoIV_IV09 rnoIV_IV10 rnoIV_IV11 mmuIV_IV09 mmuIV_IV10 ggalV_IV07 ggalV_IV08

mmuII_IIA101
ggalV_IV06 hsaIV_IV07 hsaIV_IV08

rnoIV_IV03 rnoIV_IV04 rnoIV_IV06 rnoIV_IV07 mmuIV_IV03 mmuIV_IV05 mmuIV_IV06
mmuII_IIC03 mmuII_IIC04 cellI_IIC02 hsaII_IIC01 hsaII_IIC02 hsaII_IIC03 hsaII_IIC04

hsaII_IIA202 dreII_IIA201 ggall_IIA201
dreIV_IV06 dreIV_IV09 rnoI_IB202 athI_IB203 osaI_IB202 rnoIV_IV12 rnoIV_IV13

strict rule

mmuV_V201	mmuV_V202	mmuV_V203	mmuV_V204	rnoV_V201	rnoV_V202	rnoV_V203
mmulV_IV08	cnell_IIA201	ggaIV_IV06	hsalV_IV07	hsalV_IV08	cnell_IIB01	
athII_IIB07						
mmulI_IIC04	hsall_IIC01	hsall_IIC02	hsall_IIC03	hsall_IIC04	hsall_IIC05	hsall_IIC06
rnoIV_IV10	rnoIV_IV11	mmulV_IV09	mmulV_IV10	ggaIV_IV07	ggaIV_IV08	ggaIV_IV09
athII_IIB06	athII_IIB07					
mmulV_IV13	mmulV_IV14	ggaIV_IV10	ggaIV_IV12	hsalV_IV12	hsalV_IV13	hsalV_IV14
rnoII_IIB01	rnoII_IIB03	rnoII_IIB04	athIV_IV04	athIV_IV05	athIV_IV06	drell_IIB03
mmulI_IIC03	mmulI_IIC04	rnoV_V101	ggaV_V101	drelV_IV13	cnell_IV01	hsall_IIC01
mmuV_V201	mmuV_V202	mmuV_V203	mmuV_V204	rnoV_V201	rnoV_V202	rnoV_V203
rnoIV_IV02	rnoIV_IV03	rnoIV_IV04	rnoIV_IV06	rnoIV_IV07	mmulV_IV03	mmulV_IV05
dmell_IIA201	cnell_IIA201	hsall_IIA201	hsall_IIA202	mmulV_IV01	mmulV_IV02	drell_IIA201
athIV_IV09	athIV_IV10	athIV_IV11	athIV_IV12			
mgrII_IID02	athI_IB201	osal_IB201	osal_IB204	mmul_IB201	mmul_IB202	ggaI_IB201
ggaIV_IV02	hsalV_IV01					
athIII_IIIA06	athIII_IIIA07	athIII_IIIA08	athIII_IIIA09	athIII_IIIA10	athIII_IIIA11	osalIII_IIIA02
athIV_IV03	athIV_IV05	athIV_IV06	athIV_IV07	athIV_IV08	athIV_IV09	osalV_IV07
hsall_IIA202	drell_IIA201	ggaI_IIA201				
rnoII_IIB03	rnoII_IIB04	dmell_IIB01	drell_IIB03	drell_IIB04	drell_IIB06	ggaI_IIB01
hsall_IIA103	drell_IIA101	drell_IIA102	drell_IIA103	drell_IIA104	drell_IIA105	drell_IIA106
rnoIV_IV08	rnoIV_IV09	rnoIV_IV10	rnoIV_IV11	mmulV_IV07	mmulV_IV08	mmulV_IV09
mmuV_V204	rnoV_V202	rnoV_V203	rnoV_V204	ggaV_V201	ggaV_V202	ggaV_V203
rnoIV_IV02	rnoIV_IV03	rnoIV_IV04	rnoIV_IV06	rnoIV_IV07	mmulV_IV03	mmulV_IV05
athII_IIB06	athII_IIB07					
hsaV_V101						
mmulV_IV13	mmulV_IV14	ggaIV_IV10	ggaIV_IV12	hsalV_IV12	hsalV_IV13	hsalV_IV14
hsaV_V101	cnell_V101					
hsall_IIA201	hsall_IIA202	drell_IIA201	ggaI_IIA201			
mmuV_V202	mmuV_V203	mmuV_V204	rnoV_V201	rnoV_V202	rnoV_V203	rnoV_V204
mmulI_IIC04	hsall_IIC01	hsall_IIC02	hsall_IIC03	hsall_IIC04	hsall_IIC05	hsall_IIC06

strict rule

athIV_IV09 athIV_IV10 athIV_IV11 athIV_IV12

strict rule

ggall_IIB03 mmull_IIB01 mmull_IIB02 mmull_IIB03 mmull_IIB04

ggalV_IV04 ggalV_IV05 hsaIV_IV03 hsaIV_IV04 hsaIV_IV05 hsaIV_IV06

mmuV_V204 hsall_IIA101 hsall_IIA102 hsall_IIA103 mgrII_IIC01 rnoV_V201 rnoV_V202
mmulV_IV06 ggalV_IV04 ggalV_IV05 hsaIV_IV03 hsaIV_IV04 hsaIV_IV05 hsaIV_IV06

ggall_IIB02 ggall_IIB03 mmull_IIB01 mmull_IIB02 mmull_IIB03 mmull_IIB04
dreIV_IV07 dreIV_IV08 dreIV_IV10 dreIV_IV12 rnoV_V201 rnoV_V202 rnoV_V203

ggalV_IV09 hsaIV_IV09 hsaIV_IV10 hsaIV_IV11

ggalV_IV04 hsaIV_IV03 hsaIV_IV04 hsaIV_IV05 hsaIV_IV06
hsall_IIC05 hsall_IIC06 rnoII_IIC01 rnoII_IIC02 rnoII_IIC03 rnoII_IIC04 rnoII_IIC05

mmul_IB201 mmul_IB202 athIV_IV03 osaV_V101 mmulV_IV01 mmulV_IV02 ggall_IB201

strict rule

rnoV_V204 dreV_V201 ggaV_V201 ggaV_V202 ggaV_V203 athI_IB204 osal_IB203

rnoll_IIC01 rnoll_IIC02 rnoll_IIC03 rnoll_IIC04 rnoll_IIC05 drell_IIC01 drell_IIC02

hsalV_IV09 hsalV_IV10 hsalV_IV11

athIV_IV07 drell_IIB04 athIV_IV08 athIV_IV09 drell_IIB06 athIV_IV10 athIV_IV11

hsall_IIC02 hsall_IIC03 hsall_IIC04 hsall_IIC05 hsall_IIC06 osall_IIB02 osall_IIB05

rnoV_V204 dreV_V201 ggaV_V201 ggaV_V202 ggaV_V203 athIII_IIIA01 athIII_IIIA02

mmulV_IV06 ggalV_IV04 ggalV_IV05 hsalV_IV03 hsalV_IV04 hsalV_IV05 hsalV_IV06
ggalV_IV01 ggalV_IV02 ggal_IIA201 hsalV_IV01

ggal_IB202 hsal_IB201 hsal_IB202 hsal_IB203 dmel_IB201

osalII_IIIA04 osalII_IIIA05 osalII_IIIA06 osalII_IIIA08 osalII_IIIA10

athIV_IV10 athIV_IV11 athIV_IV12 mmulV_IV12 mmulV_IV13 mmulV_IV14 ggalV_IV10

ggall_IIB02 ggall_IIB03 mmull_IIB01 mmull_IIB02 mmull_IIB03 mmull_IIB04

athI_IB204 osal_IB203 ggall_IIA101 ggall_IIA102 mmull_IIA101 mmull_IIA102 mmull_IIA103
mmulV_IV10 ggalV_IV06 ggalV_IV07 ggalV_IV08 ggalV_IV09 hsalV_IV07 hsalV_IV08

mmulV_IV06 ggalV_IV04 ggalV_IV05 hsalV_IV03 hsalV_IV04 hsalV_IV05 hsalV_IV06

dreV_V201 ggaV_V201 ggaV_V202 ggaV_V203 tanV_V201 tpaV_V201
rnoll_IIC01 rnoll_IIC02 rnoll_IIC03 rnoll_IIC04 rnoll_IIC05 drell_IIC01 drell_IIC02

strict rule

strict rule

rnoV_V203 rnoV_V204 dreV_V201 rnoI_IB202 ggaV_V201 athII_IIA103 ggaV_V202

rnoV_V204 dreV_V201 ggaV_V201 ggaV_V202 ggaV_V203 rnoIV_IV02 rnoIV_IV03

athIV_IV03 dreII_IIC01 dreII_IIC02 dreII_IIC03 dreII_IIC04 dreII_IIC05 dreII_IIC06

ggaI_IB202 hsaI_IB201 mmuIV_IV12 hsaI_IB202 mmuIV_IV13 hsaI_IB203 mmuIV_IV14

strict rule

dmeV_V201

drell_IIC03 drell_IIC04 drell_IIC05 drell_IIC06 drell_IIC07 drell_IIC08

athIV_IV12 ggall_IIB01 ggall_IIB02 ggall_IIB03 mmull_IIB01 mmull_IIB02 mmull_IIB03

rnoIV_IV08 rnoII_IIC01 rnoII_IIC02 rnoII_IIC03 rnoII_IIC04 rnoII_IIC05 mmuIV_IV07
athIII_IIIA03 athIII_IIIA04 athIII_IIIA05 drell_IIA101 athIII_IIIA07 drell_IIA102 drell_IIA105

ggalV_IV12 hsaIV_IV12 hsaIV_IV13 hsaIV_IV14

hsaIV_IV09 hsaIV_IV10 hsaIV_IV11

drell_IIC03 drell_IIC04 drell_IIC05 drell_IIC06 drell_IIC07 drell_IIC08

strict rule

strict rule

ggaV_V203 drell_IIA101 drell_IIA102 drell_IIA103 drell_IIA104 drell_IIA106 ggall_IIA101

rnoIV_IV04 rnoIV_IV06 rnoIV_IV07 rnoIV_IV09 rnoIV_IV10 rnoIV_IV11 athIV_IV02

drell_IIC07 drell_IIC08

ggaIV_IV01 ggaIV_IV02 hsaIV_IV01 ggaIV_IV10 ggaIV_IV12 dmel_IB201 hsaIV_IV12

strict rule

mmulI_IIB04

mmulV_IV08	athII_IIB05	athII_IIB06	athII_IIB07	hsaV_V101	ggaIV_IV06	dreII_IIC01
athIII_IIIA10	athIII_IIIA11	osaII_IIIA02	osaII_IIIA03	osaII_IIIA04	osaII_IIIA05	osaII_IIIA08

strict rule

strict rule

ggall_IIA102 mmul_IB201 mmul_IB202 ggal_IB201 ggal_IB202 hsal_IB201 hsal_IB202

osalV_IV07 mmulV_IV03 mmulV_IV05 mmulV_IV06 mmulV_IV09 mmulV_IV10 ggalV_IV04

hsalV_IV13 hsalV_IV14

strict rule

drell_IIC02 drell_IIC03 drell_IIC04 hsaIV_IV07 drell_IIC05 hsaIV_IV08 drell_IIC06
osaIII_IIIA10

strict rule

strict rule

hsal_IB203 mmull_IIA101 mmull_IIA102 mmull_IIA103

ggaIV_IV05 ggaIV_IV07 ggaIV_IV08 ggaIV_IV09 hsaIV_IV03 hsaIV_IV04 hsaIV_IV05

strict rule

cneV_V101

strict rule

strict rule

hsaIV_IV06 hsaIV_IV09 hsaIV_IV10 hsaIV_IV11